PLANNING COMMUNNITY HEALTH CARE

A FEASIBILITY STUDY FOR THREE FORKS, MONTANA

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PLANNING
COMMUNITY
HEALTH CARE

A FEASIBILITY STUDY
FOR THREE FORKS, MONTANA

by

Bruce Bollenbach

A professional paper submitted in partial fulfillment of the requirements for the degree of

BACHELOR OF ARCHITECTURE

Approved:

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MONTANA STATE UNIVERSITY

Bozeman, Montana

March, 1986

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TO MY

MOTHER AND FATHER

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INTRODUCTION

Several generations ago people saw the physician only if death was near, the clinics and hospitals were thought of as places to die. Health care was little more than making a person comfortable while there were ill, as not much else could be done to alleviate the condition.

In present day society, medicine is looked at as being important and necessary in preventing major illnesses as well as in curing them. Hospitals are seen as places which combat and remedy various afflictions that otherwise might result in a persons death. In addition, proper health care is becoming perceived as a right rather than a privilege. Medicine is taking a place beside other community responsibilities such as education, sanitation, fire protection, etc. as an expected service for the citizens.

This architectural thesis intends to explore the planning procedures involved in the design of a feasible health care facility for the rural community of Three Forks, Montana. Such a study will lead to a better understanding of how medical

facilities can be designed and established in small towns previously without such care.

THE STUDY WILL INCLUDE:

-The Service Area - people, housing, economy, industrial base, climate, geography, and existing civic facilities.

-The Patient Needs - existing health care resources and utilization data, family health needs program, future requirements.

-The Physical Plant - the location, design, size, cost, and function of the facility itself.

THE STUDY WILL LEAVE FOR OTHERS:

-The Regional Plan - how the facility fits into the state health program.

-The Organization - business relationships, internal makeup, and chain of command.

-The Financial Picture - establishing and maintaining the operation of the facility on a sound financial footing.

My procedure of research will be to evaluate the service area and the patient needs, then interpret this data to develop the program requirements for the physical plant (see Appendix A). **Such a procedure may or may not lead to a specific building type but it will respond to the desires of the service area, which is my goal.**

BASIC PREMISES

The planning of a health care facility as it is perceived today involves not only the projection of current patterns into the future, but it must also take into account the composition of the population and devote some attention to exploring various program alternatives.[1] The primary goal is to plan and design with more responsiveness and sensitivity to the needs of the community.

Consumers, as a whole, are relatively uninformed about health care services. They are unable to judge for themselves not only the level of service they require, but also the quality of service they are receiving. Their primary concerns center about rising costs, perceived shortages of medical personnel (due to difficulties in making an appointment), and an apparent uneven distribution of services.[2]

With these problems in mind, it falls upon the architect or planner, when programing a new facility or expanding an existing one, to educate himself and the community about the role a medical

facility will play in their town. He must work with the local physicians and politicians in order to develop a building program which addresses the needs of the area.

Determining the needs of the area usually begins by taking community characteristics and likening them to health services that would potentially be used by the community. Yet some of these relationships are not fully understood, such as the potential health problems per socio-economic group, and the impact location would have on demand. In addition, it is difficult to predict the health impact, of health services, on a population. Economically how do you measure workdays saved and increased efficiency? With a healthy population would there be lower welfare and thus increased tax revenue? It's hard to measure.[3]

With a multitude of planning subtelties as well as some obvious physical and economical restraints to consider, a procedure is needed which will enable the architect or planner to gather data and

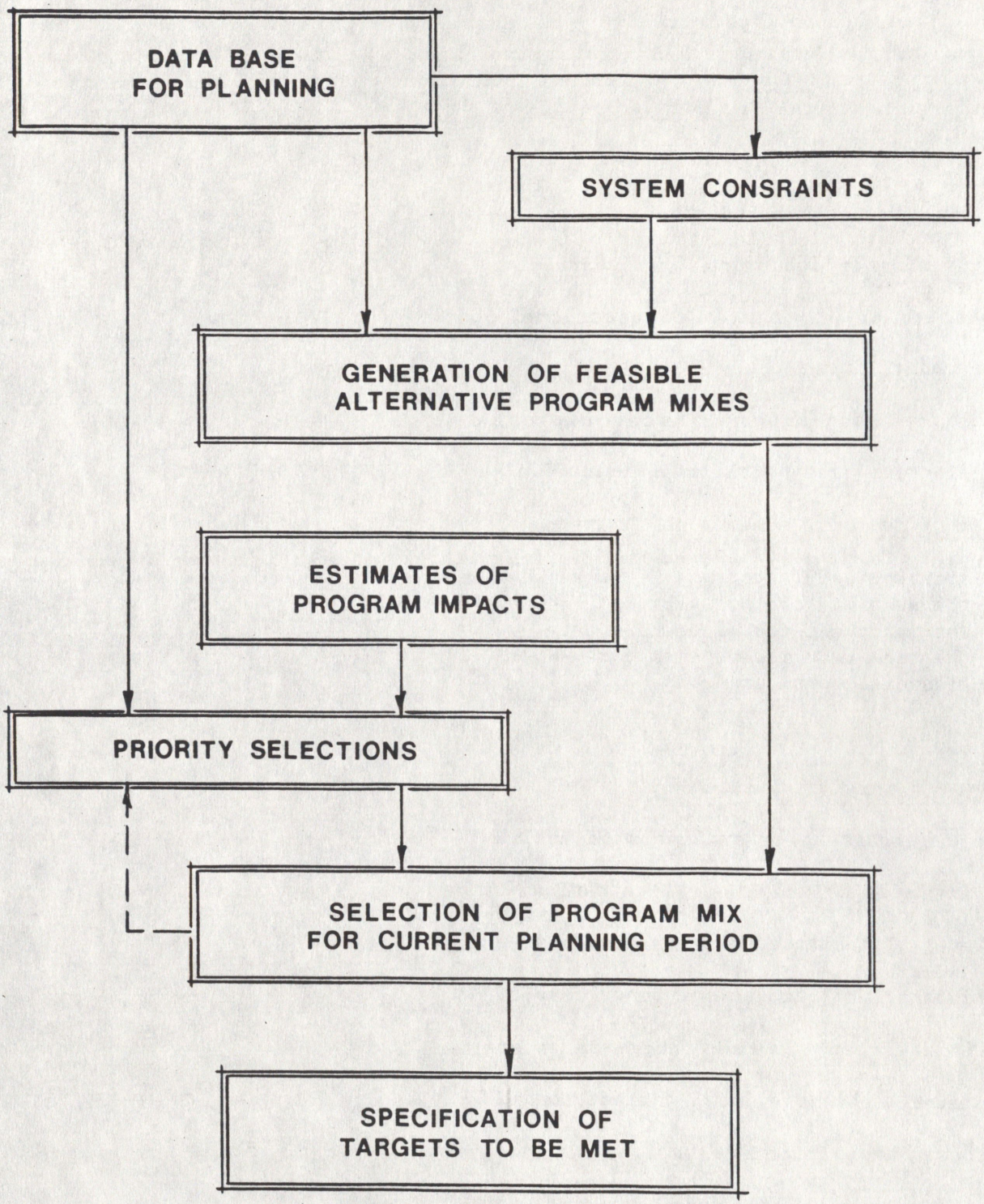
narrow down solutions in order to arrive at a final program. One such procedure is shown in Illustration 1. This planning model allows for the editing of data and the refining of solutions toward arriving at a specific program by constant challenge and refinement.

Initial decisions to seek medical attention are made by the individual for a number of reasons, some of which are:

-sociological factors
-the severity of the symptoms
-the inconvenience of seeking care
-the time required to seek care
-financial considerations

Once a decision has been reached, the extent of care is decided by the physician; referrals to other levels of health care are made as shown on Illustration 2. The level of health care needed in an area should take into account occupancy data of facilities in surrounding cities in order to determine possible local patient loads.

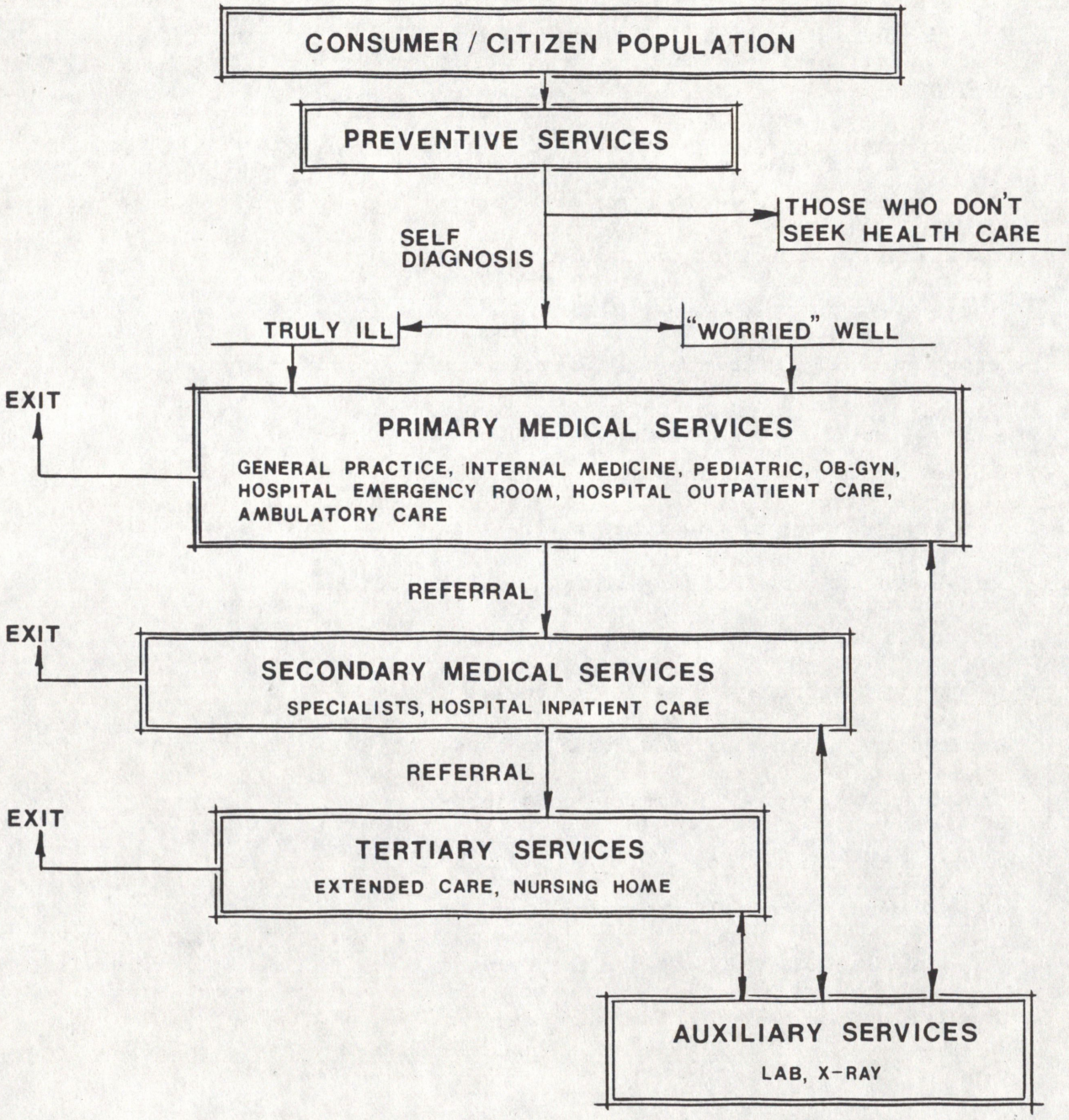
These basic premises outline some of the decisions needed and problems to overcome when planning for community health care. A more in depth study of an area is required for medical facilities



SOURCE:
PLANNING AMBULATORY HEALTH
CARE DELIVERY SYSTEMS

1
ILLUSTRATION

HEALTH PLANNING PROCESS



SOURCE:
PLANNING AMBULATORY HEALTH CARE DELIVERY SYSTEMS

HEALTH CARE DELIVERY SYSTEM STRUCTURAL MODEL

2

ILLUSTRATION

THE SERVICE AREA

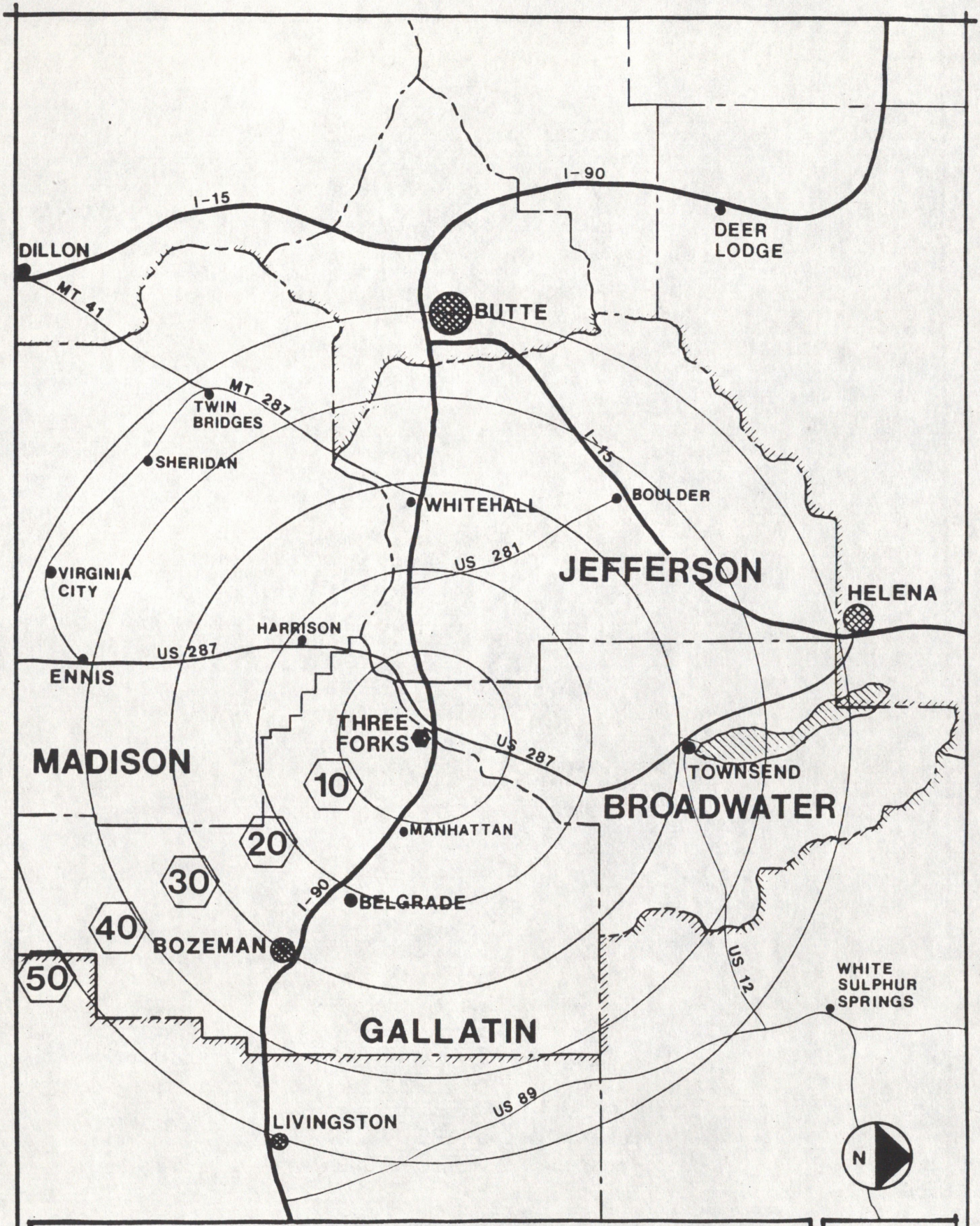
THE STATE AND COUNTY

Montana is a state of approximately 817,000 people of which 47.1% are rural inhabitants, this works out to 5.4 people per square mile. With such a sparse population, decisions about health care facilities cannot always be based upon economics and patient load. Travel time and distance are definite concerns, (see Illustration 3) although not as much in the western part of the state as it is in the eastern part. Driving 20 to 30 miles is not seen as a major inconvenience, people in Montana are used to it, however, medical emergencies and foul weather cause distances to become a planning consideration. Montana's leading causes of death by age groups (see Illustration 4) show accidents high on the list for the younger population while heart disease claims older citizens.

Population projections show increases in most of the counties in the Three Forks area, Gallatin County having the most influence (see Illustration 5). Leading causes of death in Gallatin County are:

than would be needed for fire protection, education, or sanitation facilities. Although the physical building program of health care structures may or may not turn out to be more complex than other civic building programs, the total planning process involves many more variables in predicting current and future area demands.

(1) heart disease, (2) cancer, (3) stroke, (4) chronic obstructive pulmonary diseases, and (5) accidents.

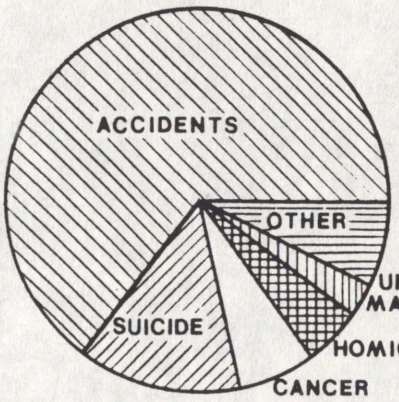


TRAVEL DISTANCE

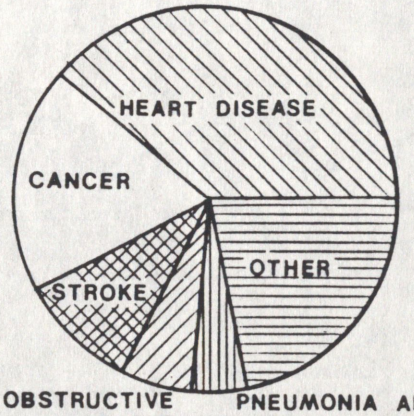
FOUR COUNTY REGION, MONTANA

3

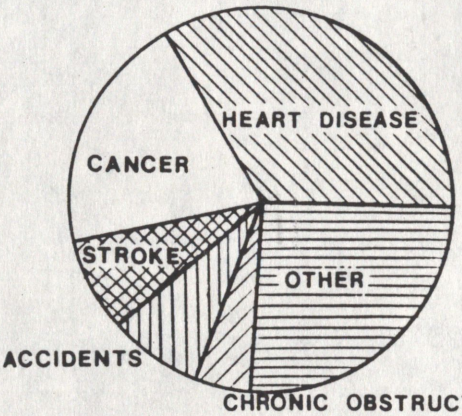
ILLUSTRATION



15 - 24 YEARS
180 DEATHS



65+ YEARS
4695 DEATHS

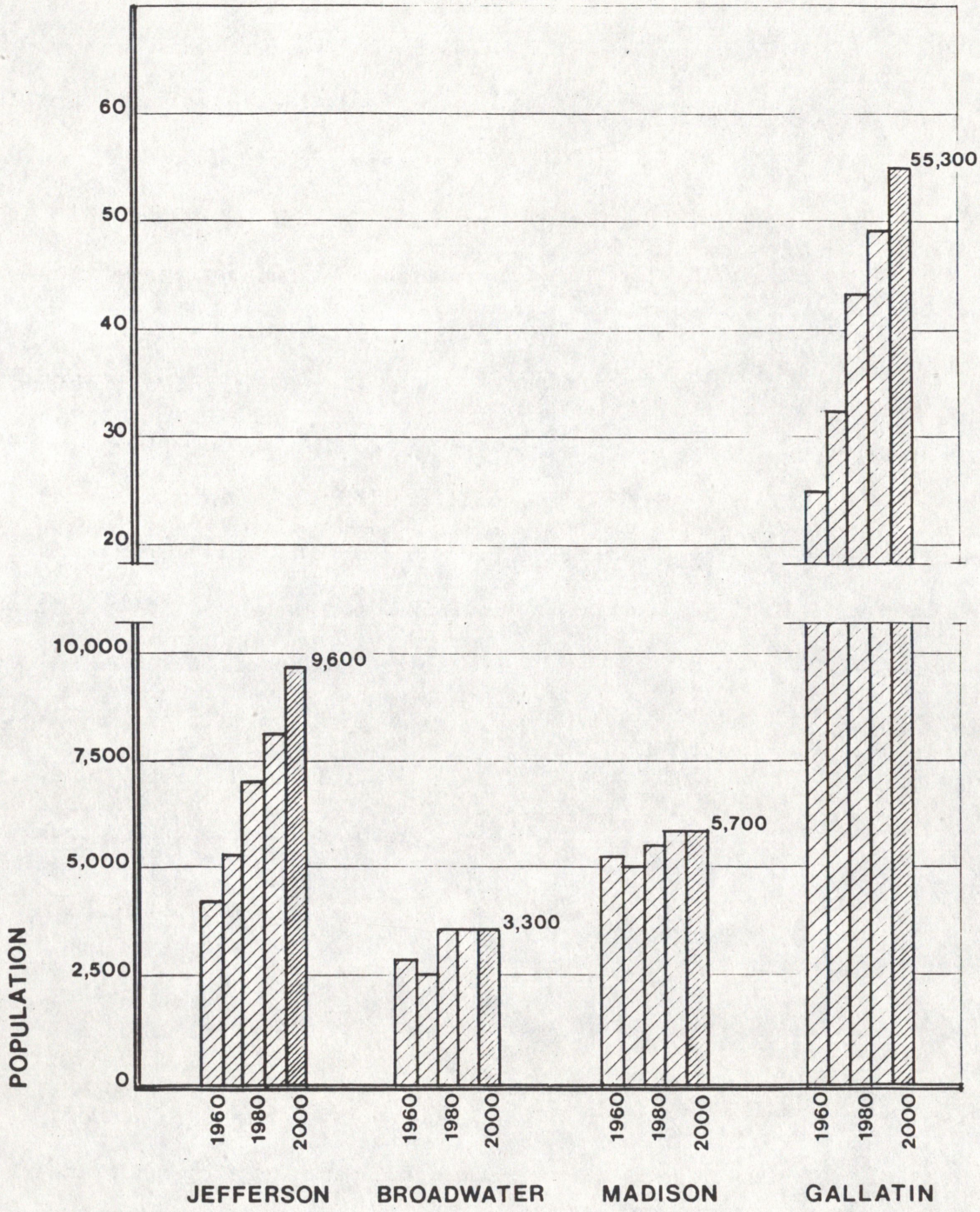


ALL AGES
6699 DEATHS

SOURCE: 1983 MONTANA VITAL STATISTICS

4
ILLUSTRATION

CAUSES OF DEATH
MONTANA



SOURCE:
1984 MONTANA STATISTICAL ABSTRACT

POPULATION PROJECTION

FOUR COUNTY AREA, MONTANA

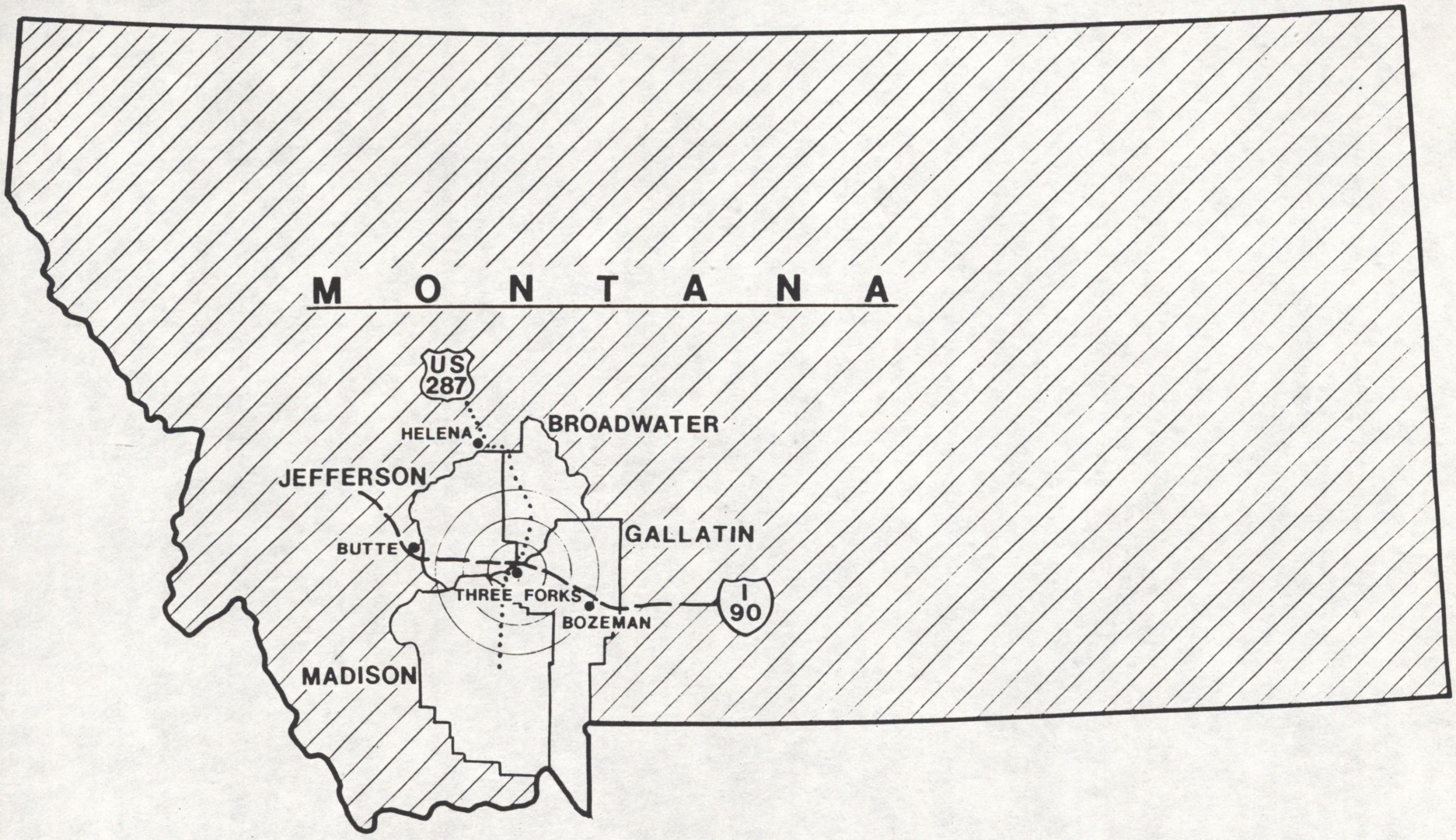
5

ILLUSTRATION

THREE FORKS

The city of Three Forks is located between the Jefferson and Madison Rivers in the western section of Gallatin County, Montana. The city is serviced by an airport, east-west Interstate 90, north-south Highway 287, and the Burlington Northern Railroad. Nearby major cities include; Bozeman (30 miles east), Butte (53 miles west), and Helena (66 miles north) (see Illustration 6). Three Forks has a 1984 population estimate of 1,364 people with a per capita income of $6,912.00.[1]

As a rural community, the town is stable and self sustaining, harboring a clear, clean environment, free from extensive smog and other forms of pollution.[2] Located at the "Headwaters of the Missouri River" Three Forks is nationally known for its excellent hunting and fishing.[3] This is evident in the latest Cabela's Sportsmans Equipment Catalog where the top of the line fishing vest is the "Three Forks" model (second in line being the "Willow Creek", a town just south of Three Forks).



6

ILLUSTRATION

LOCATION MAP

THREE FORKS, MONTANA

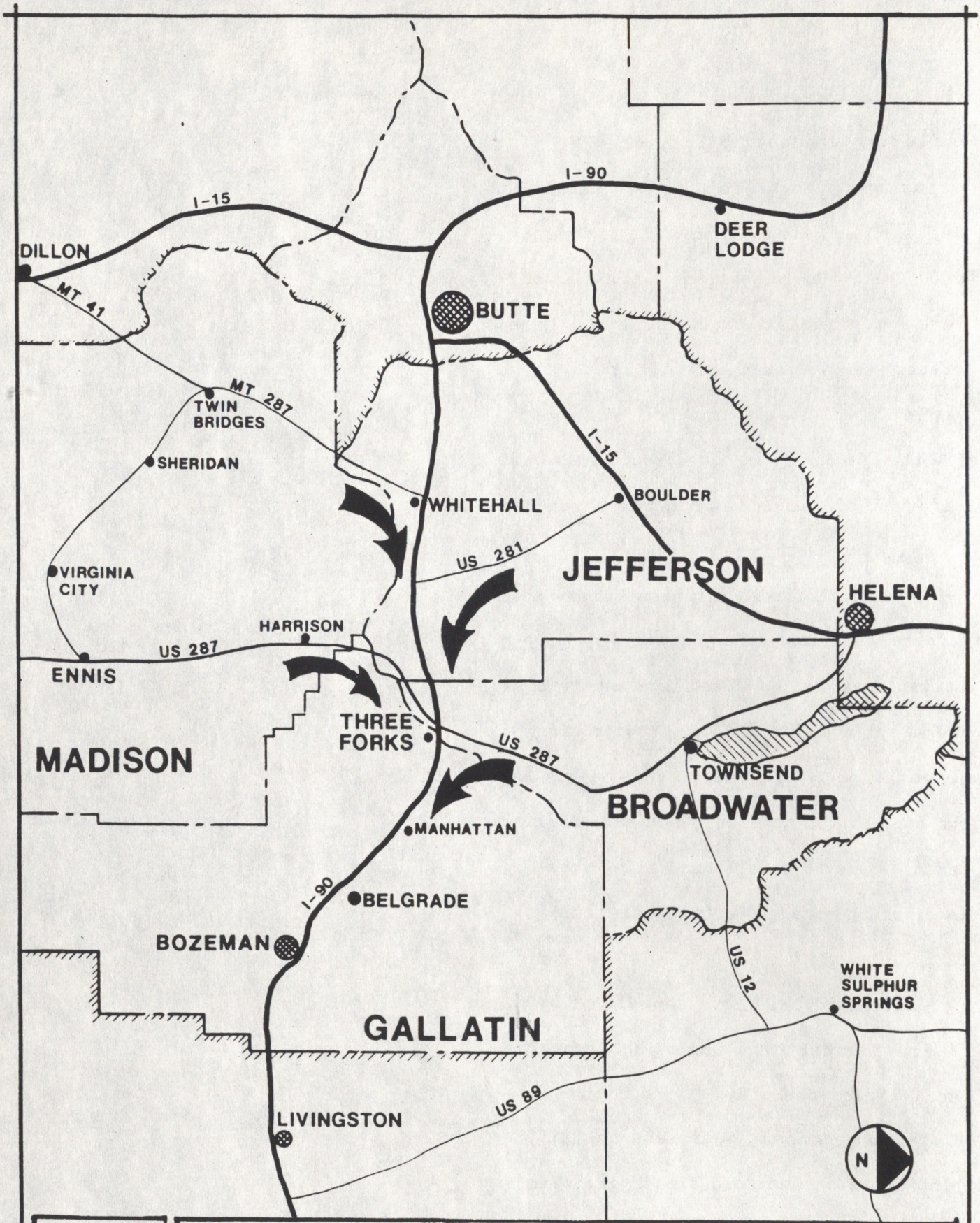
The recent slump in agriculture has been felt by the service industries in town, although new jobs are being created by the building of a new talc plant, a trucking terminal, and a log home manufacturing center.[4] The Ideal Cement plant in Trident has called its workers back and is stable although the corporation itself is having some problems.[5] Tourism provides another source of income to the local economy by promoting the "Lewis and Clark Caverns", the "Madison Buffalo Jump", and the "Headwaters State Park". Also strong in the area are small enterprises such as a pallet factory, a saddlemaker, and a precast concrete company, as well as various other cottage industries.[6]

Three Forks has attracted some people who work in the Gallatin Valley because it has no major housing problem and it is cheaper to live there than in, say Bozeman.[7] The town exhibits a typical agricultural community population migration pattern, slow but steady growth with a number of children moving away upon maturing.[8]

One of the communities goals involves exploring the possibility of a medical clinic.[9] The local physician, Dr. Bertagnolli, feels there is a definite need for a clinic, but of a somewhat different character than those in other areas.[10] Dr. Durham, the cities dentist, believes that sharing a clinic would benefit the community in convenience as to the referral of patients from the physician and vice versa.[11]

A medical clinic in Three Forks might also help redirect the "Fringe Area" population in toward the Bozeman specialist and away from Butte. This redirection of orientation would refer people living at the edge of the Bozeman Deaconess Hospital service zone to a Gallatin Valley location for special treatment (see Illustration 7).[12]

In summation, there appears to be an interest in establishing a public health facility for the city, there is a stable and varied economic base, and the city's location on a minor crossroads gives it a large area draw potential (see Illustration 8).

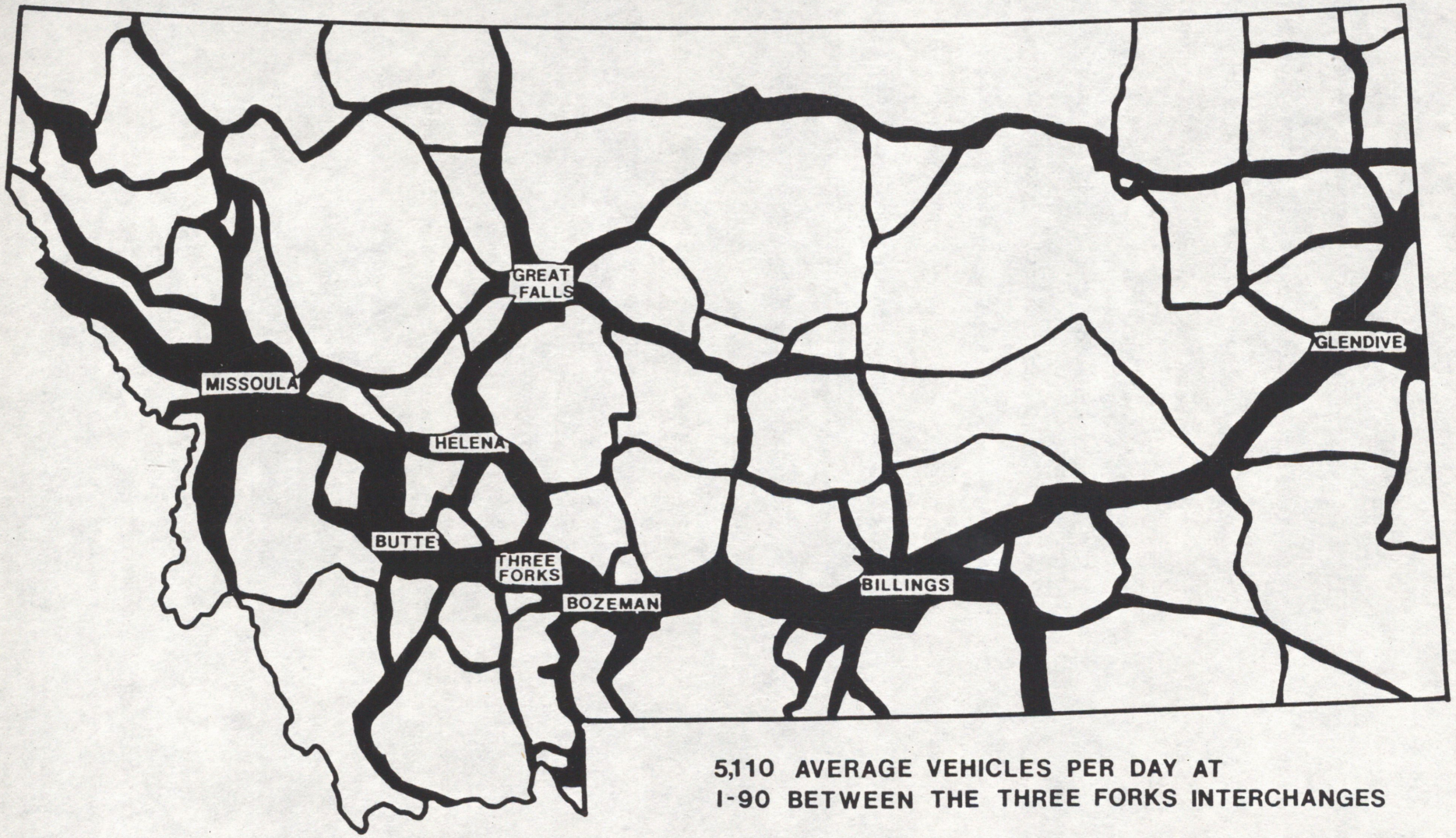


7

ILLUSTRATION

VICINITY MAP

FOUR COUNTY REGION, MONTANA



5,110 AVERAGE VEHICLES PER DAY AT
I-90 BETWEEN THE THREE FORKS INTERCHANGES

8
ILLUSTRATION

HIGHWAY USE MAP

MONTANA

N

SOURCE:
1984 MONTANA STATISTICAL ABSTRACT

HISTORY

The Missouri River Headwaters were a favorite hunting ground for many tribes of Indians such as the Blackfeet, Crow, Nes Perce, Shoshone, Bannock, and Flathead. The area often became their battleground as well when territorial disputes arose.

The first tourists began to arrive in July of 1805 in the form of the Lewis and Clark Expedition.[13] The three rivers comprising the headwaters were named by Lewis and Clark after Albert Gallatin, Secretary of the Treasury, James Madison, Secretary of State, and Thomas Jefferson, President of the United States. Sacajawea, a Shoshone guide for the exibition, is honored locally by a park and an historic hotel.

In 1809 Manual Lisa built a fort for the Missouri Fur Company but trouble with the Blackfeet forced its abandonment. Although trappers and traders continued to frequent the area, settlement didn't really begin until the discovery of gold at Bannock, Gold Creek, and Alder Gulch.[14] People would come across the plains and up

the Missouri to Fort Benton, from there they headed south to the Gold Fields.

Gallatin City was established in 1863 just above the mouth of the Gallatin River on the West Bank. The town was made the County Seat and remained so until 1868.

James Shed began erecting toll bridges south of town in 1867 which were faster and more convenient than at Gallatin City. Shed also built a hotel and the area gradually became known as Bridgeville.

In 1884 all the interests were sold to a group of English investors under the leadership of Lord Duncan T. Hunter. Lord Hunter had the town incorporated under the name of Three Forks. This site is now known as Old Town.

In 1908 the Milwaukee and St. Paul Railroad located their division point one mile south of Old Town. This location is the present site of Three Forks. In September a giant lot sale was held by the Milwaukee Land Company and 72 lots were sold. What was left of Gallatin City and most of Old Town began to move to the new location.

People began to organize for a more orderly growth by electing city officials, organizing fire protection, limiting saloons, appointing a sanitation engineer, setting aside land for a cemetary, and establishing a pest house for infectious diseases.

Situated in a crossroads of travel, the Sacajewea Hotel was built in 1910 by John Adams, purchasing agent of the Milwaukee Railroad. The rear section of the hotel was moved from Old Town and the hotel today is listed on the Historic Register.

Three Forks today still enjoys a good tourist trade as well as a varied agricultural/industrial economy. Situated as it is in one of the faster growing regions on Montana the future of the town appears bright.[15]

PUBLIC SERVICES[16]

(See Illustration 9).

Fire Protection:

The 28-member volunteer fire department is located at 13 East Date. Two rural trucks and a 1000 gpm pump truck comprise the equipment.

Police Protection:

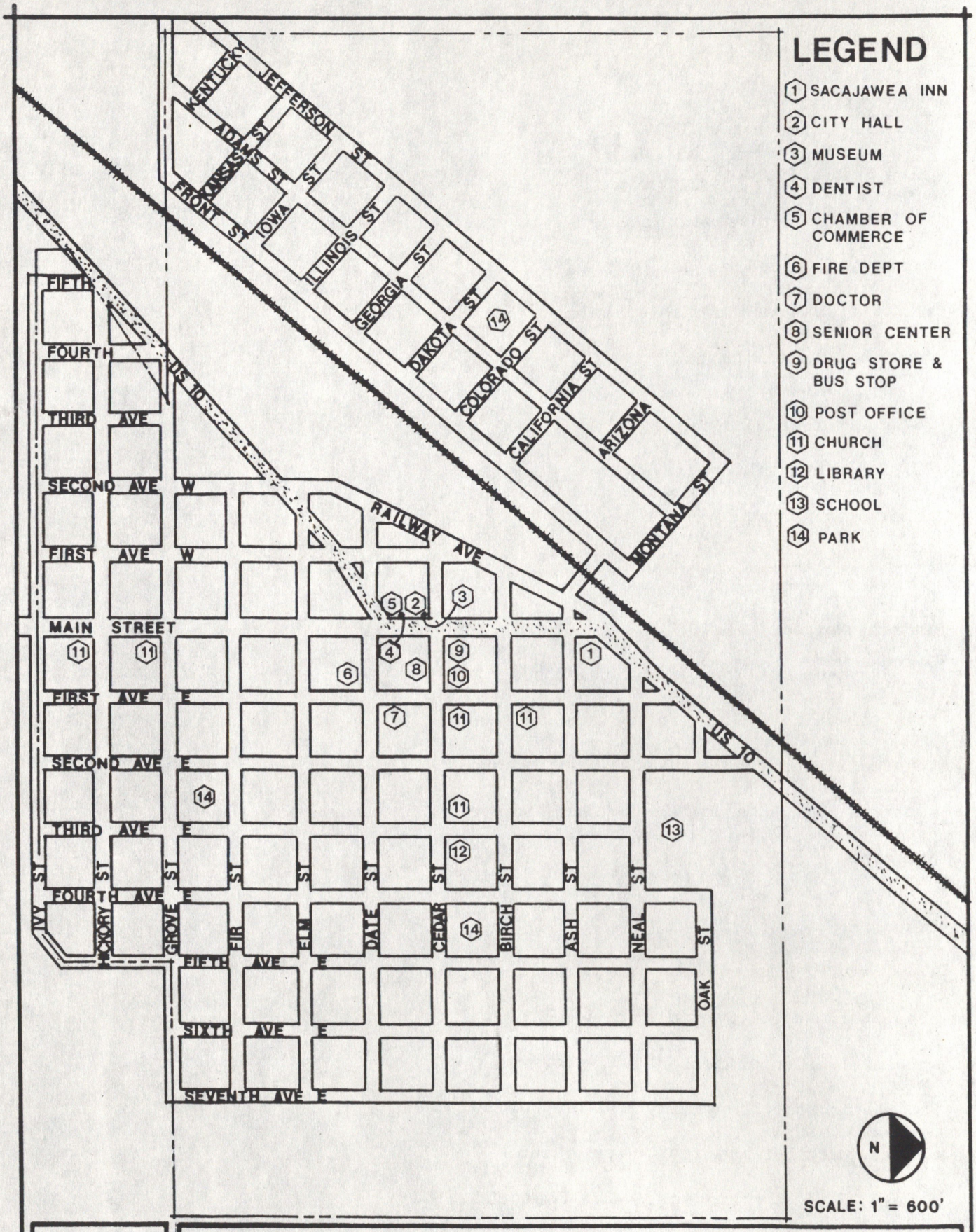
Service is provided by two city policemen with city hall serving as the police station.

Medical Service:

Residents of Three Forks use Bozeman's hospital which is serviced by an ambulance located in the fire station. A doctor and a dentist practice in the town in private offices.

School:

Three Forks has a preschool, an elementary school, and a high school with a total 1981 enrollment of 400 students.[17] The public school facility consists of 30 classrooms, 2 libraries, 2 gymnasiums, 1 cafeteria, 2 playgrounds, and a football



9

ILLUSTRATION

COMMUNITY MAP

THREE FORKS, MONTANA

field. The teacher pupil ratio is 1 to 14 with a bussed attendance of 120 students.

Community Facilities:

The city has a library located on 2nd Avenue East and a Museum on Main Street.

Social and Church Functions:

Three Forks has an active Senior Citizens Social Center located across from the Post Office. Churches of the Methodist, Baptist, Lutheran, Latter-Day Saints, Catholics, and Christian Center Faiths hold services in the community

Communication:

Cable television is available as well as the local newspaper, The Three Forks Herold.

LAND USE AND ZONING

Three Forks comprises an area of approximately 558,[18] which is divided into various different uses (see Illustration 10).

Most of the vacant land is located in the western part of town and is used for pasture. A strip of land in the eastern section is being studied for use as a golf course (see Illustration 11).

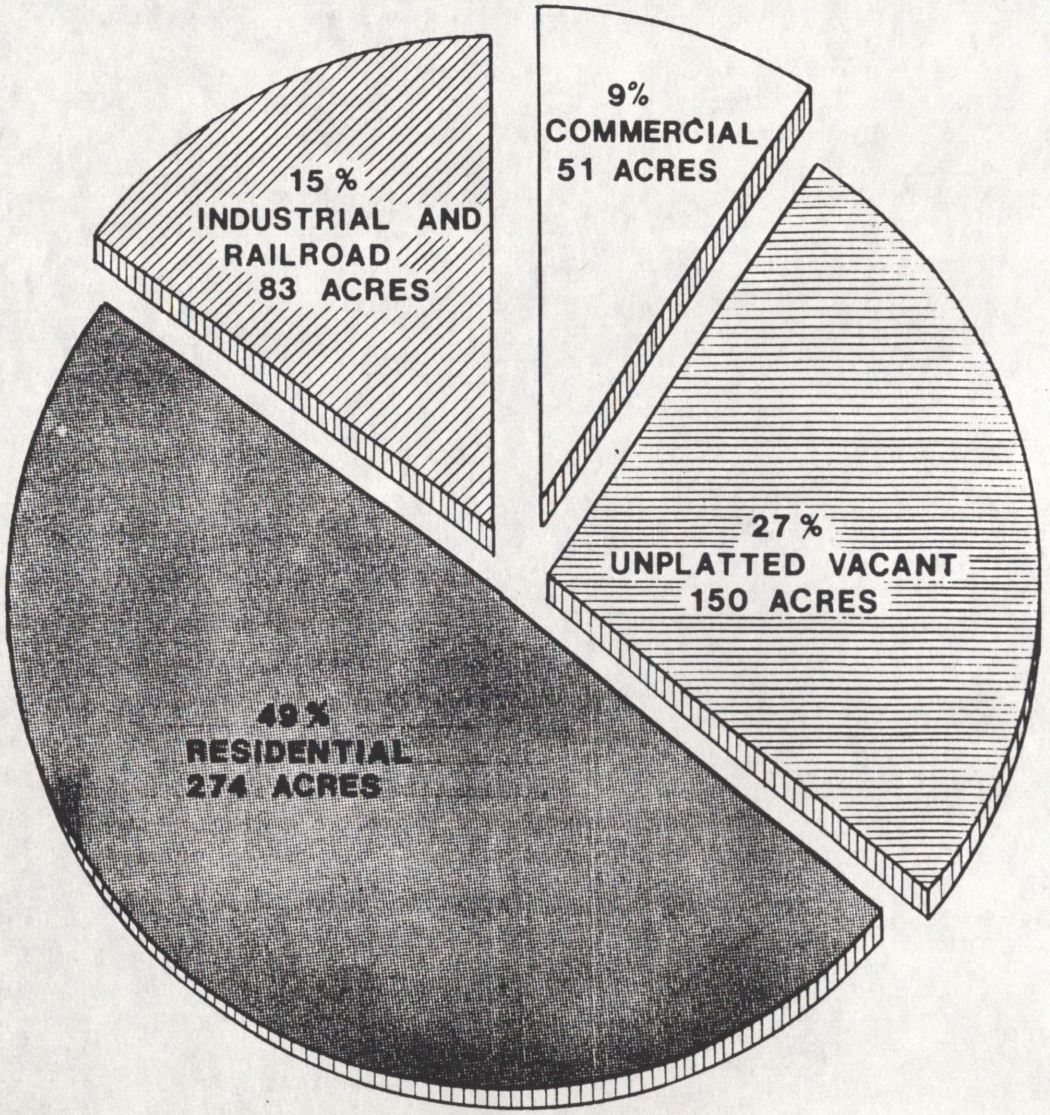
The industrial section runs primarily along the railroad tracks, diagonally through town. Just outside of town are several other industries also (see Illustration 12). The Montana State Fish and Game Department maintains the two large ponds to the east of town as a recreational facility.

Public recreation facilities in the town consist of Stevenson Park, Baseball Park, Peterson Park, and the Three Forks School Complex comprising 19.6 acres.[19]

The Three Forks zoning ordinance, prepared in December, 1983, provides for the following nine districts:

AG-Agricultural District
AG/R-Agricultural/Residential District
R-Residential District
R/AI-Residential/Airport Influence
NHB-Neighborhood Highway Business District
CBD-Central Business District
GI-General Industrial District
PLI-Public Lands Institutional District
T-Transitional District

Possible locations for medical facilities are limited to Districts NHB and CBD (see Illustration 13).[20]

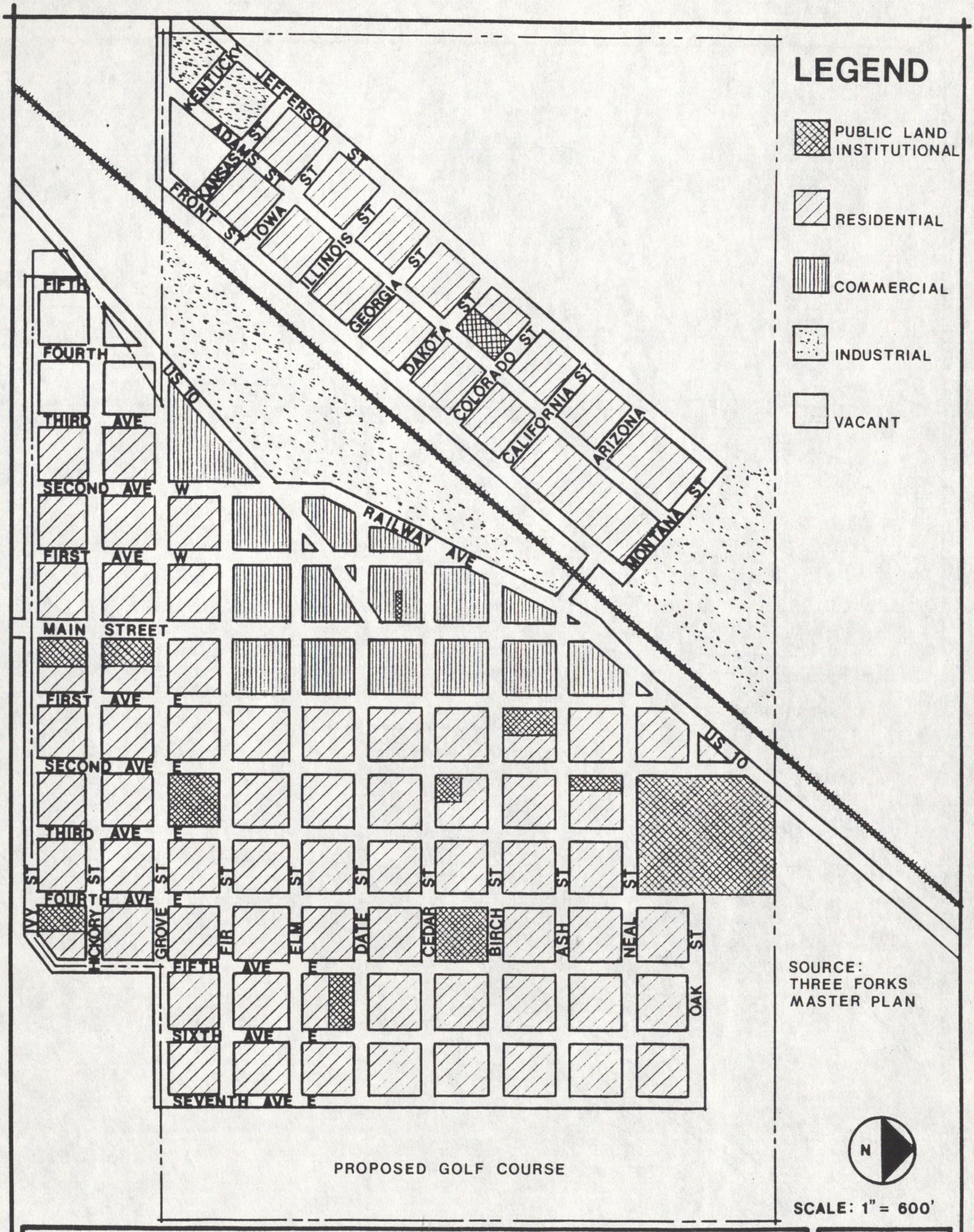


SOURCE: THREE FORKS MASTER PLAN

10
ILLUSTRATION

LAND USE

THREE FORKS, MONTANA

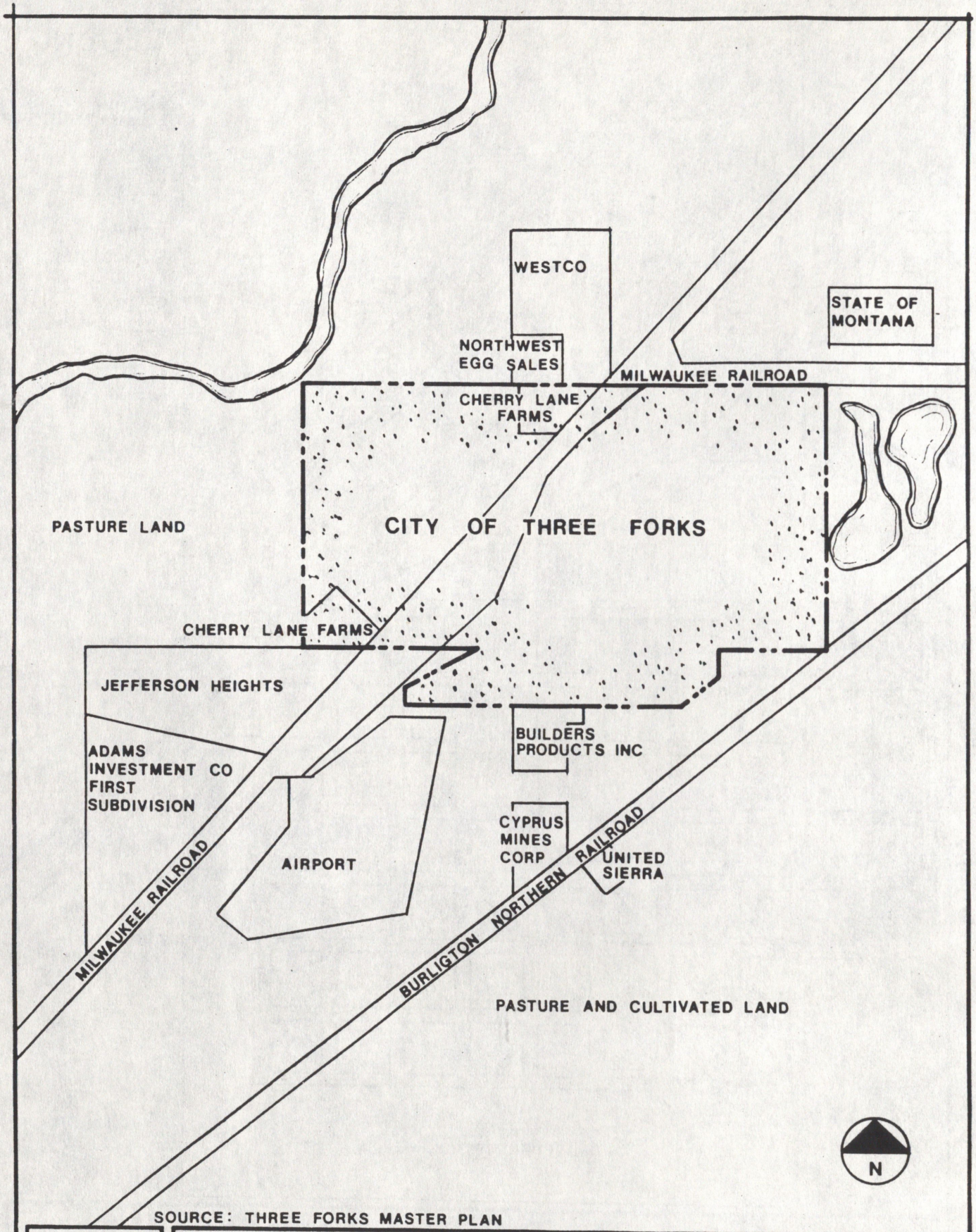


CURRENT LAND USE

THREE FORKS, MONTANA

11

ILLUSTRATION

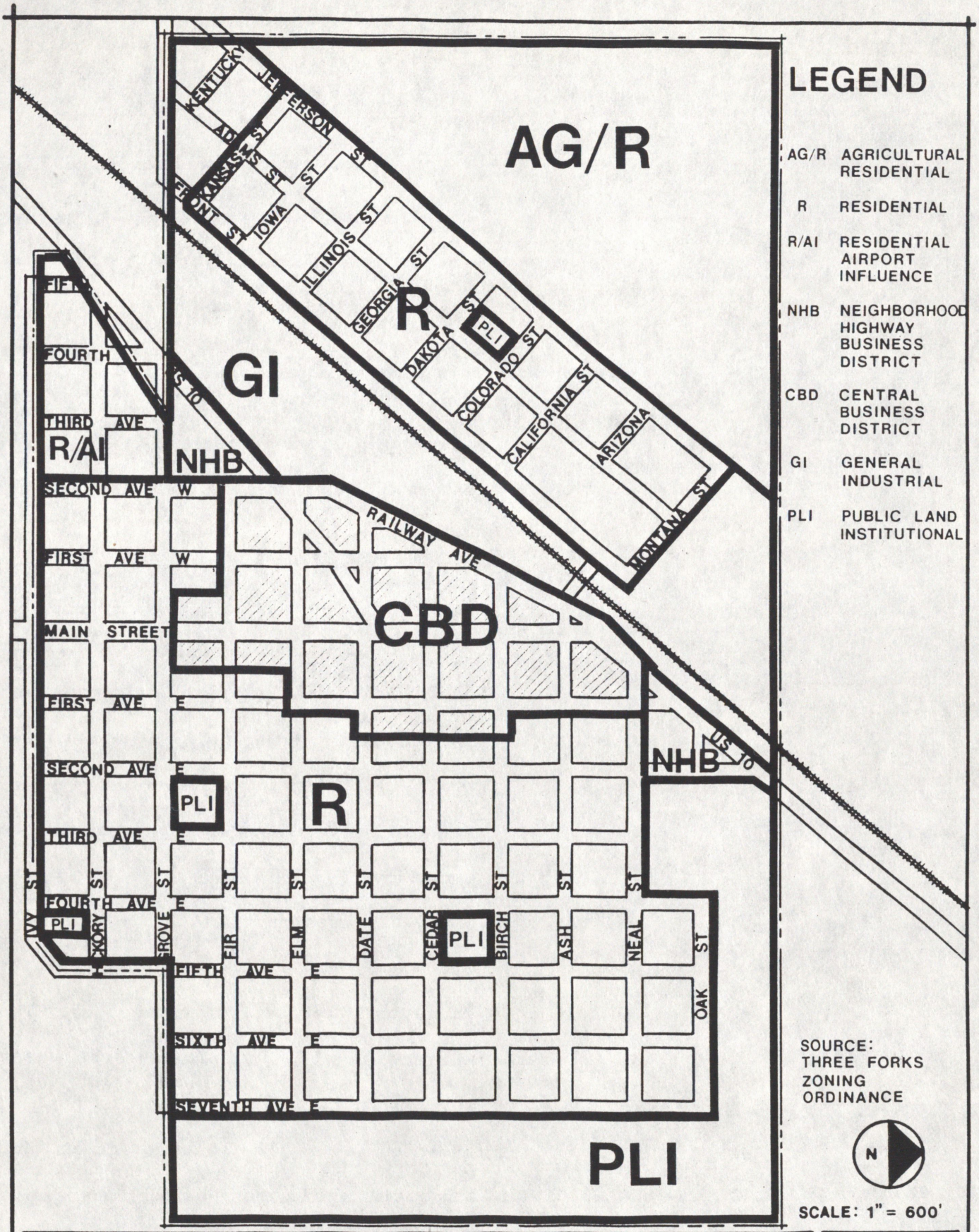


SOURCE: THREE FORKS MASTER PLAN

12
ILLUSTRATION

LAND USE MAP

THREE FORKS SURROUNDINGS



LEGEND

AG/R	AGRICULTURAL RESIDENTIAL
R	RESIDENTIAL
R/AI	RESIDENTIAL AIRPORT INFLUENCE
NHB	NEIGHBORHOOD HIGHWAY BUSINESS DISTRICT
CBD	CENTRAL BUSINESS DISTRICT
GI	GENERAL INDUSTRIAL
PLI	PUBLIC LAND INSTITUTIONAL

SOURCE:
THREE FORKS
ZONING
ORDINANCE

N

SCALE: 1" = 600'

ZONING MAP

THREE FORKS, MONTANA

13

ILLUSTRATION

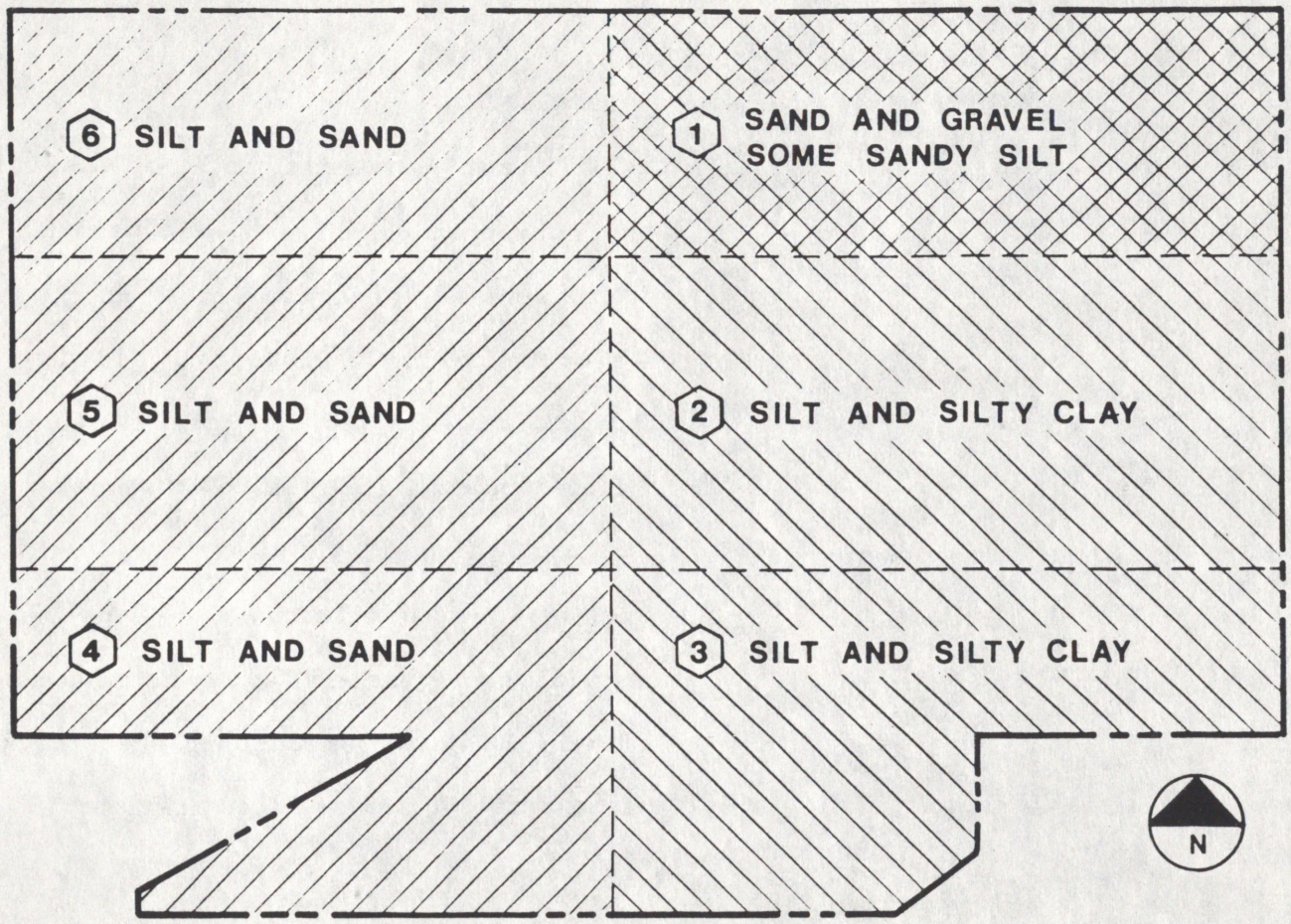
GEOGRAPHY[21]

The Three Forks landscape consists mainly of the floodplains of the Madison and Jefferson Rivers. The city is located in the northwest part of an east-west elongated intermontane basin of about 1,000 square miles. The benchland contains very little slope and is at an elevation of 4,060 feet.

GEOLOGY AND SOILS[22]

Outwash from the Jefferson and Madison Rivers form the main geologic composition of Three Forks. Underlying this outwash is the east-west running Willow Creek fault. Flooding and seismic activity are the two geologic hazards present in the community.

Soils are sandy and gravelly loams which are very shallow but differ greatly in depth from one area to another. The surface is well drained, but the water table is high. The northeastern part of the city has a higher percentage of sand and gravel while the remainder has a high percentage of silt and clay (see Illustration 14).



DEPTH IN FEET

1. 0–4 clean sand and fine gravel
   4–6 clean sand and coarse gravel
   6–13 clean sand and gravel

2. 0–2 silt and silty clay
   2–13 sand and gravel

3. 0–3 silt
   3–6 silty clay
   6–18 silty clay and course gravel
   8–13 sand and gravel

4. 0–4 silt
   4–10 silty sand and gravel
   10–13 clean sand and gravel

5. 0–3 silt
   3–4 silty sand
   4–13 sand and gravel

6. 0–4 silt and silty sand
   4–6 sand and gravel
   6–9 clean sand and gravel

SOURCE: THREE FORKS MASTER PLAN

GEOLOGY AND SOIL

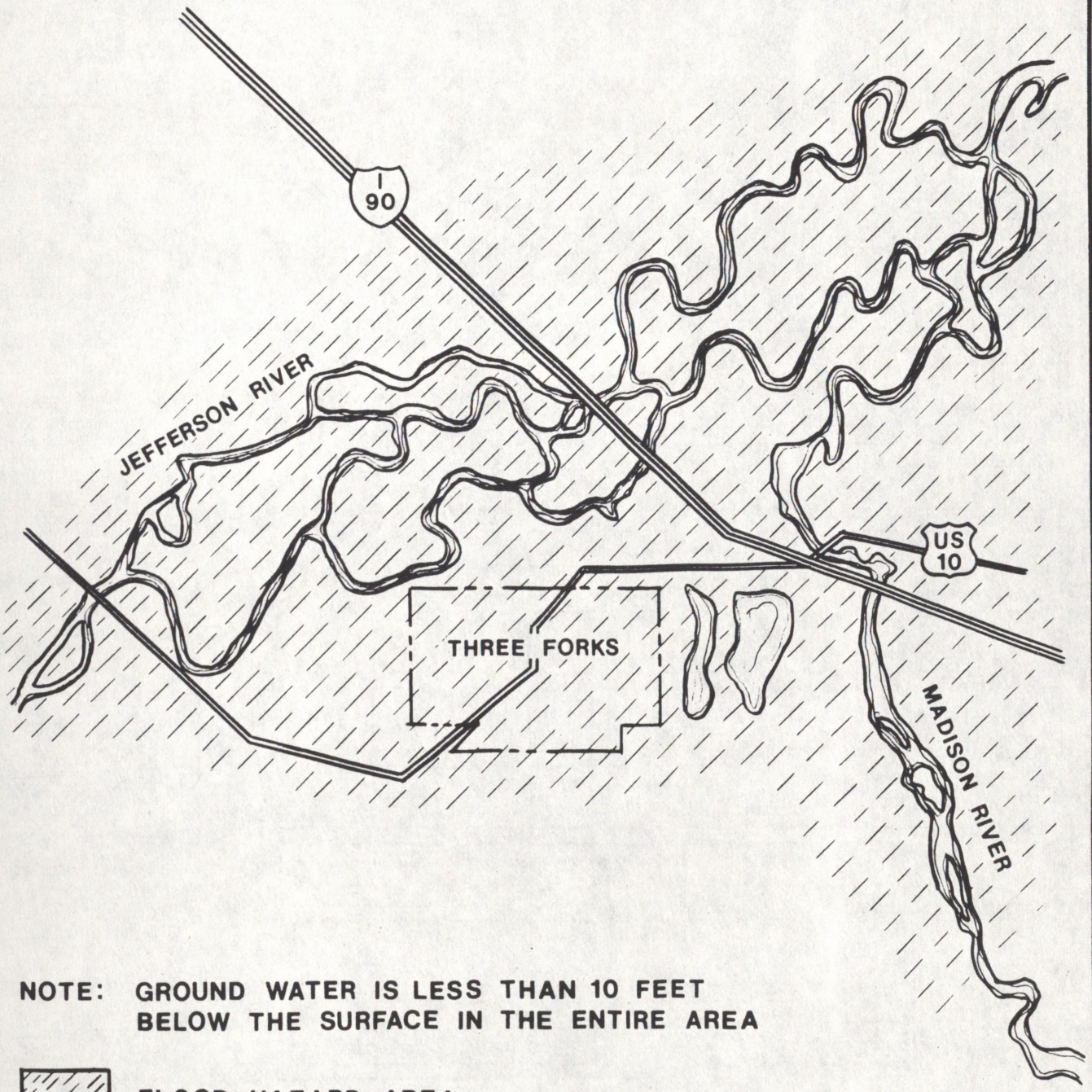
THREE FORKS, MONTANA

14

ILLUSTRATION

HYDROLOGY[23]

Three Forks is in a susceptible position on the flood plain between the Madison and Jefferson Rivers and is subject to periodic flooding. Flooding is caused primarily by ice jams. An ice jam flood would be expected to force water out of the Madison on the west levee or breakout of the channel above the levee. Water moving northwesterly would be stopped by the highway system causing it to backup into Three Forks (see Illustrations 15 and 16).



NOTE: GROUND WATER IS LESS THAN 10 FEET BELOW THE SURFACE IN THE ENTIRE AREA

FLOOD HAZARD AREA

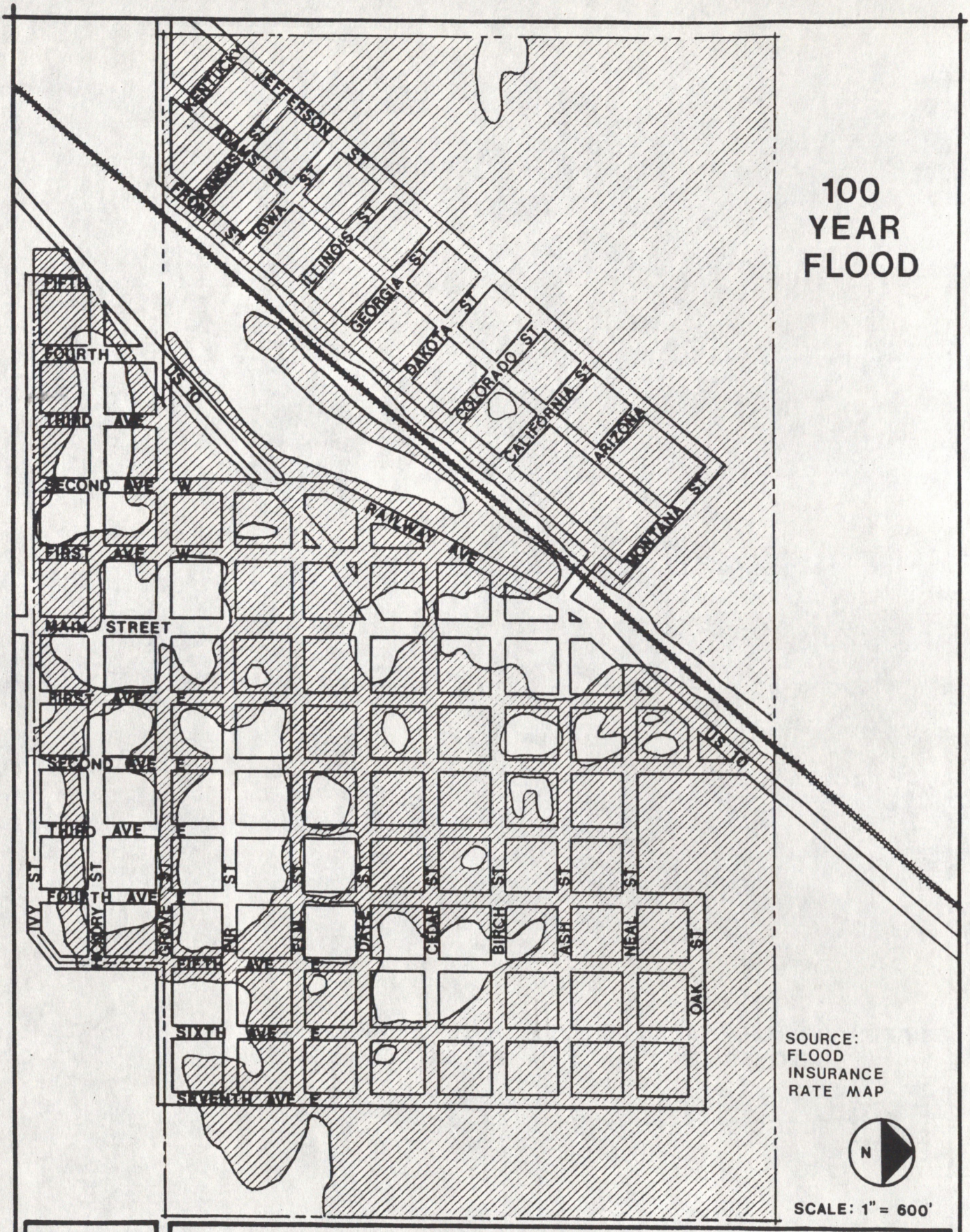
SOURCE: THREE FORKS MASTER PLAN

HYDROLOGY MAP

THREE FORKS SURROUNDINGS

15

ILLUSTRATION



16
ILLUSTRATION

FLOOD PLAIN
THREE FORKS, MONTANA

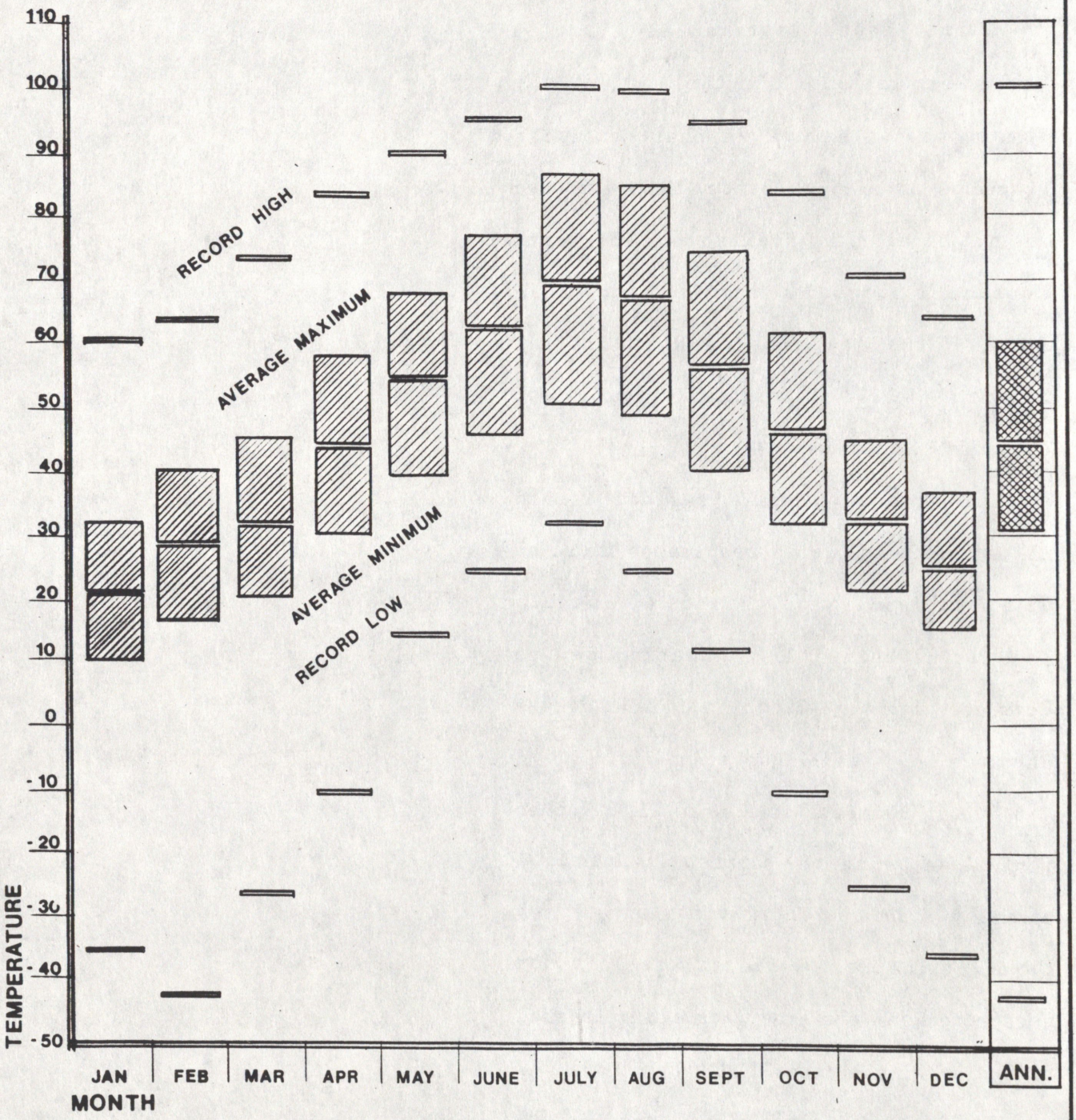
CLIMATE

Climate data is taken as close to Three Forks as possible (Trident) as the town does not have a weather recording station. Bozeman (Belgrade) data was used if no other was available. Trident, Montana is located a short distance from Three Forks at Latitude N45° 57' and Longitude W111° 29' with an elevation of 4,036 feet.

Temperature normals reflect a cold climate ranging from a mean temperature of 21.3° in January to only 69.4° in July (see Illustration 17). Heating degree days are high at 7422 while cooling degree days are 343 (see Illustration 18).

Annual rainfall is a mere 11.46 inches with June being the wettest. Snowfall annually stands at 29.7 inches with March bringing the most. The snowfall is not enough to keep the area from being labeled as a dry climate (see Illustration 19).

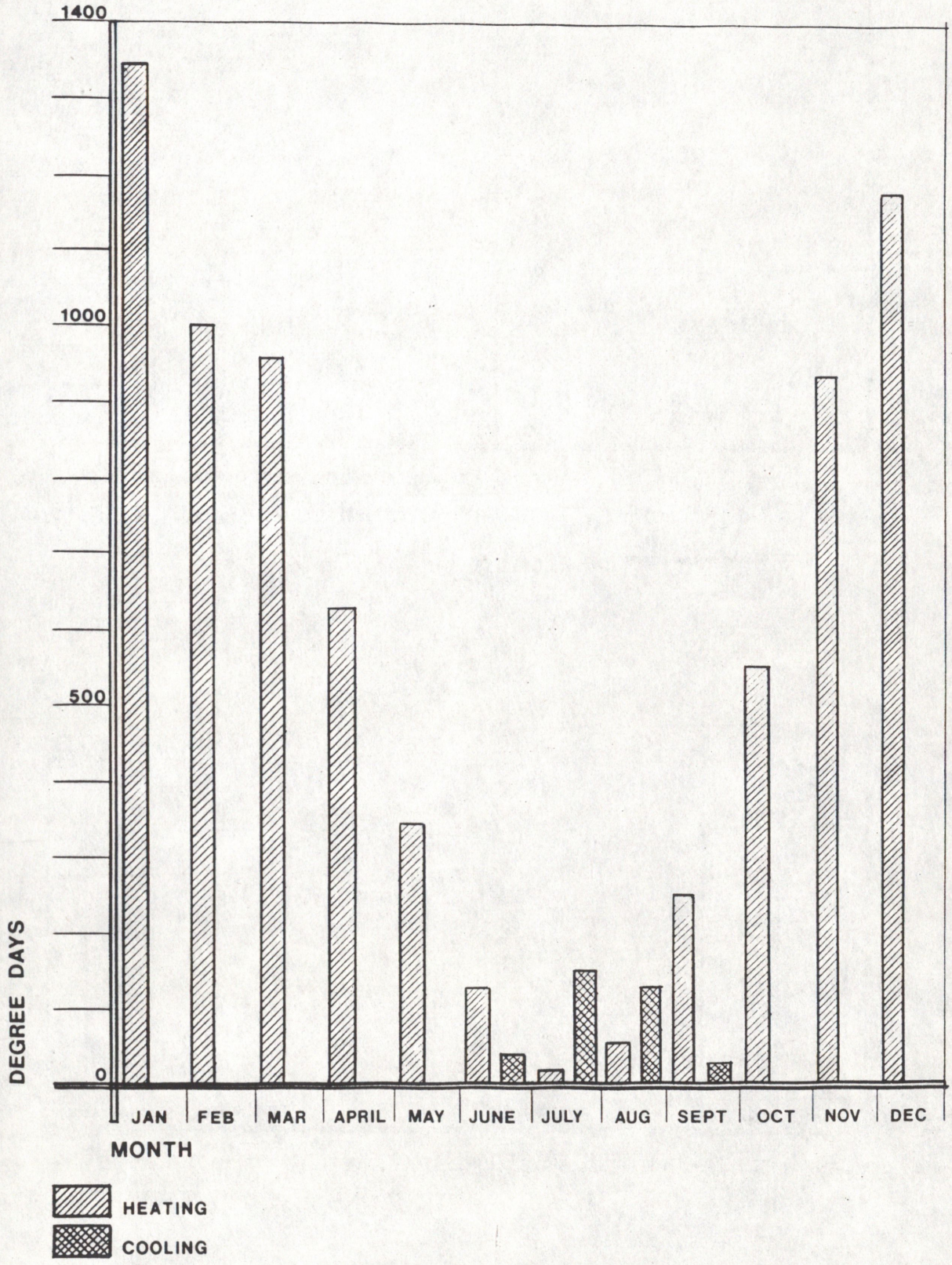
The yearly average wind speed is 6.3 mph mostly blowing from the west and west-north-west. Spring is the windiest season (see Illustration 20).



17
ILLUSTRATION

TEMPERATURE

THREE FORKS, MONTANA

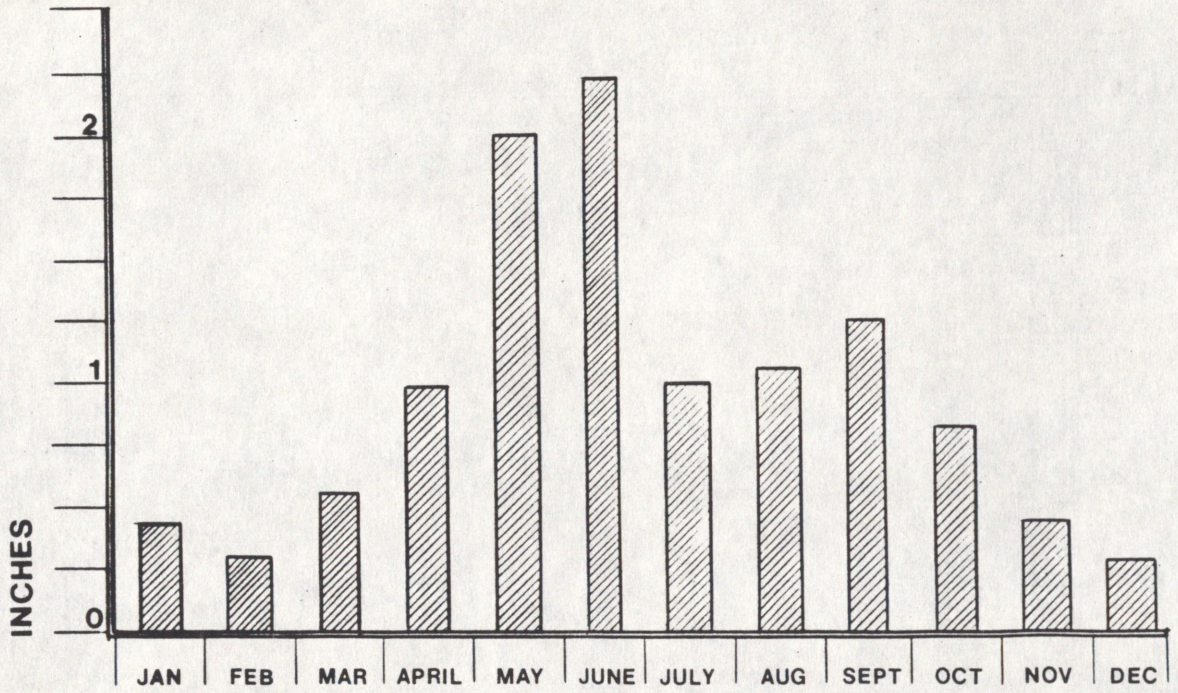


DEGREE DAYS

THREE FORKS, MONTANA

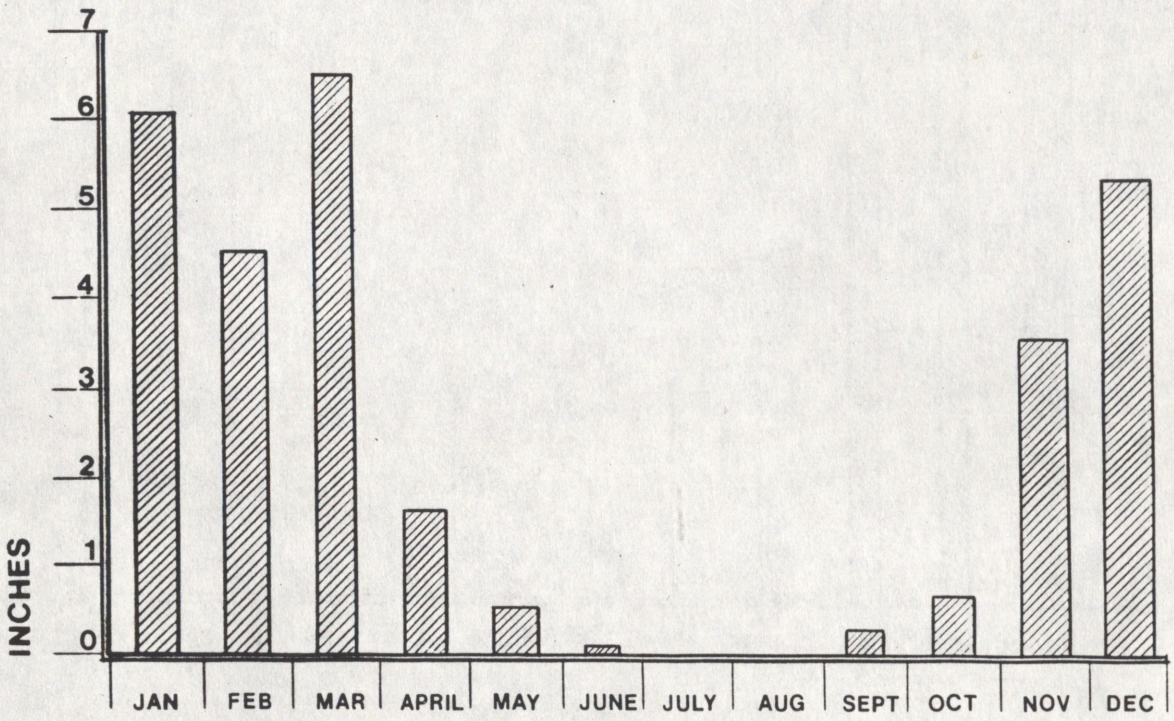
18

ILLUSTRATION



RAIN

ANNUAL RAINFALL 11.46 in.



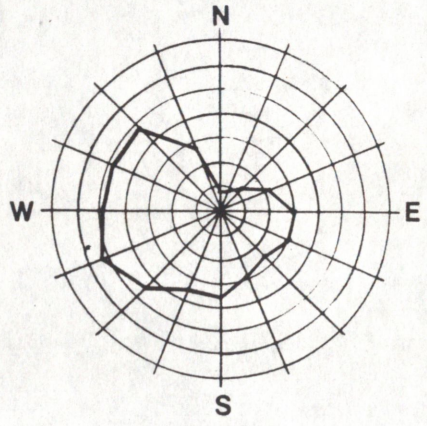
SNOW

ANNUAL SNOWFALL 29.7 in.

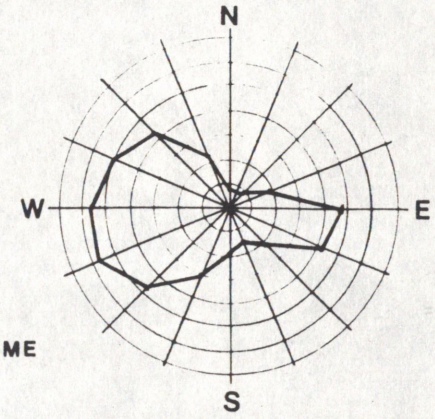
19
ILLUSTRATION

RAIN AND SNOW

THREE FORKS, MONTANA

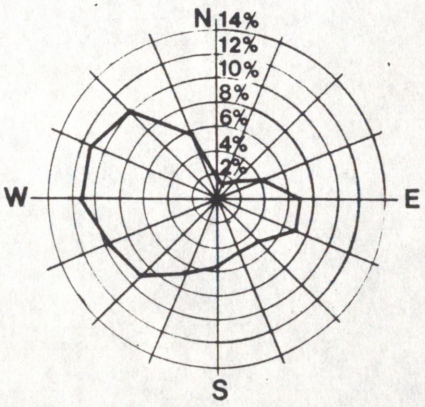


JANUARY

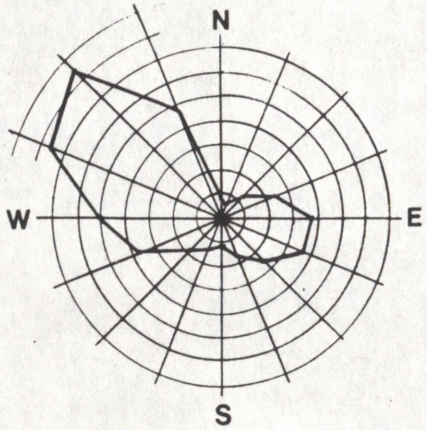


APRIL

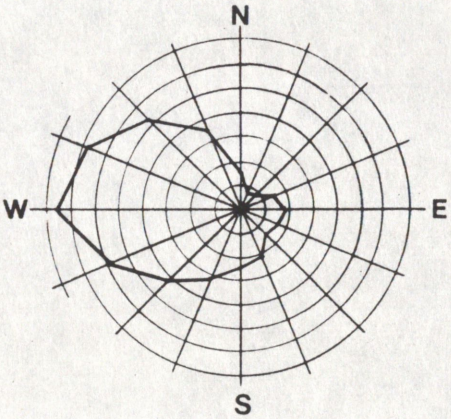
PERCENTAGE OF TIME
PER DIRECTION



YEAR



JULY



OCTOBER

AVERAGE MPH	4.72	5.13	5.87	7.60	8.00	7.32	3.09	6.23	6.49	6.53	7.39	7.22	6.30
	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	ANNUAL

WIND

THREE FORKS, MONTANA

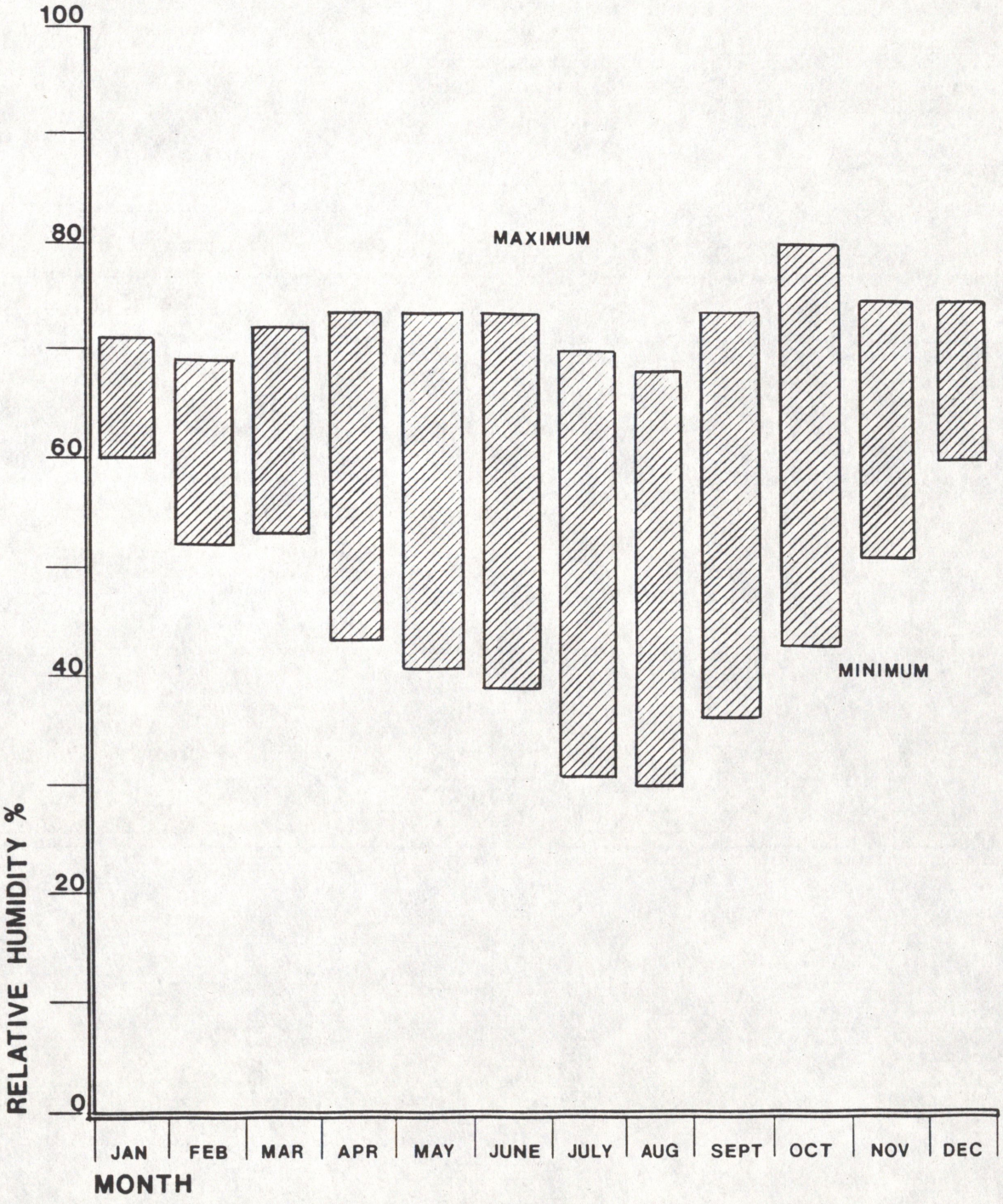
20

ILLUSTRATION

Relative humidity ranges from a minimum average of 30% in August to a maximum average of 80% in October, reflecting a dry climate (see Illustration 21).

Mean daily insolation is greatest in July and least in December. Sun angles vary from 21° on December 21 to 68° on June 21 (see Illustration 22).

As can be seen from the previous illustrations, Three Forks is located in a cool, dry, and moderately windy area.

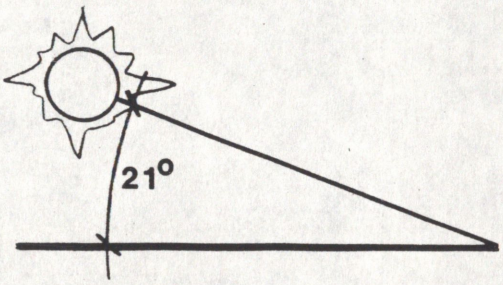


HUMIDITY

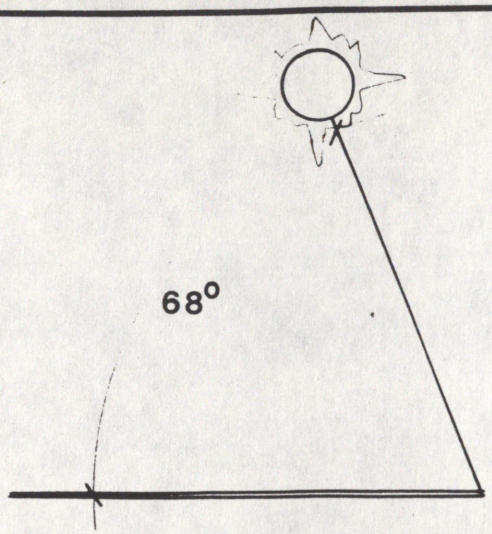
THREE FORKS, MONTANA

21

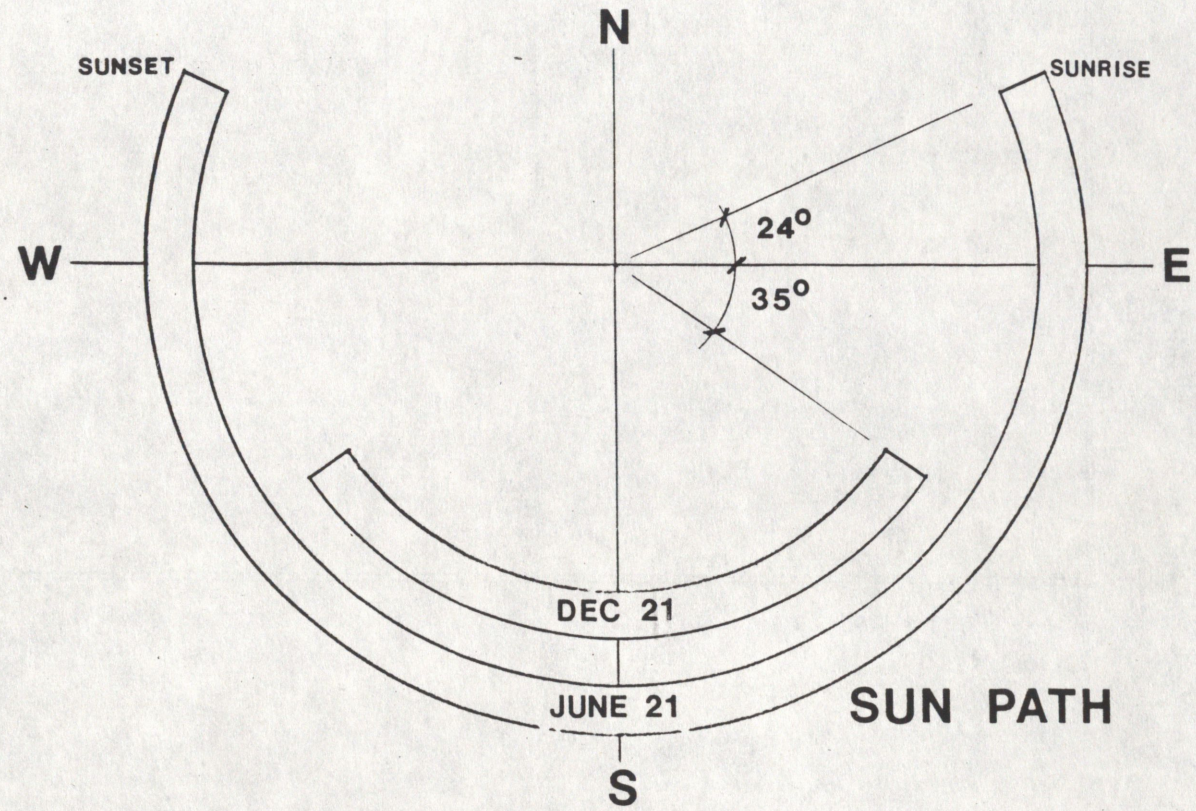
ILLUSTRATION



DEC 21



JUNE 21



SUN PATH

22

ILLUSTRATION

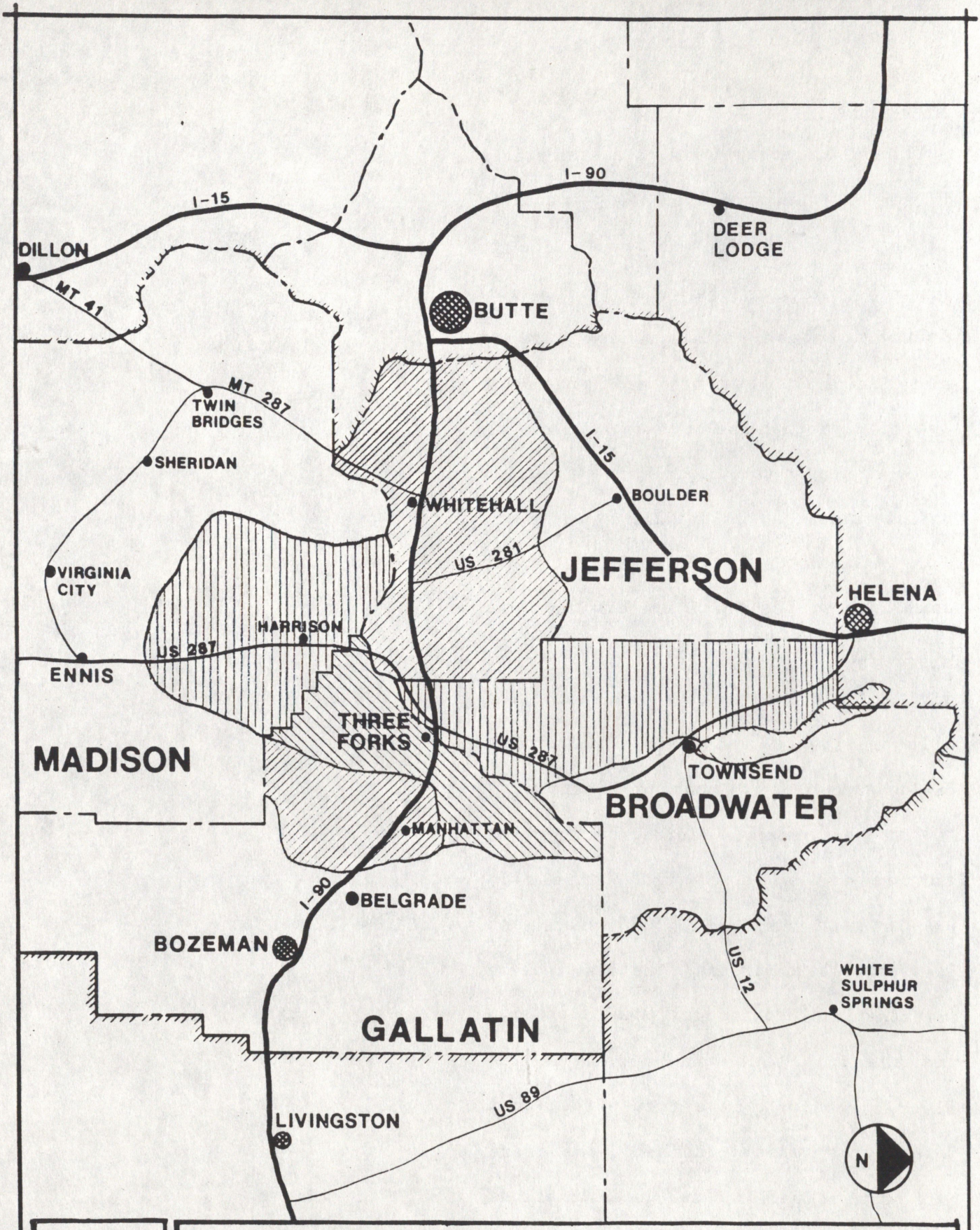
SUNSHINE

THREE FORKS, MONTANA

QUALITY OF LIFE

The 1980 census contains a statistical blueprint which indicates the personality of an area. Traits such as economic growth, population age, education levels, industrial base, etc... can be used to ascertain the quality of life in a specific part of the country. Through a study of census data, surpluses as well as deficiencies, can be discovered and planned for. The National Census is broken down into states which are divided into counties. The counties are further divided into enumeration divisions (see Illustration 23) which are also further divided according to population density.[24]

For this thesis, I intend to study the characteristics of the Whitehall, Harrison, Three Forks, Manhattan, and Townsend west divisions. One must realize and take into account the population size and the fact that some people in the district wouldn't have much affect on a Three Forks medical facility, therefore only basic comparisons and generalizations are possible as specific details would



23
ILLUSTRATION

ENUMERATION DISTRICTS
FOUR COUNTY REGION, MONTANA

involve an independent survey. Characteristics were chosen which might point out a special health care need or otherwise determine the feasibility of a medical facility. Except as noted, all population, economic, housing, and occupation information was derived from the 1980 Census (see Appendix B).

PEOPLE

Populations (1980):

Montana	786,690
Gallatin County	42,865
Madison County	5,448
Jefferson County	7,029
Broadwater County	3,267
Enumeration Districts:	
Three Forks Division	1,997
Townsend West Division	745
Whitehall Division	2,511
Harrison Division	762
Manhattan Division	3,061
Three Forks	1,247
Whitehall	1,030
Manhattan	988
Ennis	660
Townsend	1,587

Relative Size of the Population

The town of Three Forks is 13.7% that of the combined poulation of the enumeration districts studied. The enumeration districts are 1.2% that of Montana.

Farm Population

The area has a higher percentage of people living on farms (15%-1312) compared with that of Montana (7%-58,396).

Population by Sex

Three Forks and the enumeration districts have a slightly higher number of men (51%) compared with the state average (50%).

Projected Population Growth

Shows a slow but steady increase.

Population by Age

Three Forks appears to have a somewhat older population than that of the enumeration districts and of the state.

Marital Status

Three Forks shows slightly fewer single people and slightly more widows. In the enumeration districts there are more married people than the state average.

Female Population by Age

On the whole, the female population appears older compared with the state.

Population by Race

The area is primarily white with very few minorities.

Population by Ancestry

There seems to be no dominant ancestrial group, although the amount of English and Dutch are a little higher than the state average. Most citizens are of a multi-ancestrial background.

Persons in Selected Multiple Ancestry

English, German, and Irish groups predominate throughout.

Veteran Status

The number of veterans are about the same as most communities in the state.

ECONOMICS

Average Per Capita Income (1979)

Three Forks	6,269
Enumeration Districts	6,659
Montana	6,589

Persons Below the Poverty Level

The area as a whole is slightly below (10.1%) the state figure (12.3%).

Number of Households by Income (1979)

As indicated here, Three Forks and the surrounding area have a larger percentage of people in the lower income brackets.

Number of Families by Income (1979)

As seen here, Three Forks and the surrounding area are slightly below the state average.

Education Level

A large portion of the population end their education after graduating from high school; over a quarter of the population never graduates.

HOUSING

Number of Families

Three Forks	352
Enumeration Districts	2,487
Montana	207,525

Mean Number of Children Per Family Type

The figures are just slightly less than the state mean.

Number of Households

Three Forks	499
Enumeration Districts	3,191
Montana	283,742

Households by Number in Household

A two-person household is the average size, Three Forks having a greater percentage than the state average.

Population by Place of Birth

As a whole, the population is very stable with only around one-third migrating.

Population by Residence in 1975

The majority of people have kept their same house (1980) following the state average.

Renter Population

Three Forks	22%
Enumeration Districts	17%
Montana	26%

Rental Housing Units and Median Rent (1979)

The area has somewhat fewer rental units (21% to 31%) and a lower median monthly rent (123 to 165).

Housing Units by Value

Housing units in the area are less expensive than the statewide figures.

Housing Units by Age

Three Forks and the enumeration districts consist predominantly of older homes.

Vacant Housing Units

The area has a slightly larger amount of facancies (13.4%) than the state average (10.0%).

Multi-Family Housing Units

There appears to be a large amount of mobile homes in the area and in Three Forks.

Home Heating Fuel

In addition to utility gas in the communities, the rural population uses fuel oil for heat.

Home Cooking Fuel

Electricity is the common type with utility gas getting some use in the city.

Home Hot Water Heating Fuel

Utility gas shows the community influence, with electricity being used the most in the country.

INDUSTRIAL BASE

Vehicles Per Housing Unit

The area has slightly more two and three vehicle housing units than the state average.

Transportation to Work

Fewer people drive and more people walk than compared with the state averages.

Travel Time to Work

The majority of people in Three Forks are within nine minutes to work, although the area shows some longer distance driving.

Households by Income Type

There is a large percentage of farm and non-farm self-employment, a slightly larger amount of social security, and slightly less public assistance.

Occupations

The area is big in agriculture while Three Forks itself employees a number of

people in administrative support positions and has a large service industry.

Industry

Manufacturing broadens the base of the areas economy while most industries with the exception of agriculture are below the state percentages.

Class of Worker

There is a high percentage of self-employed for the area.

MAJOR EMPLOYERS IN THE THREE FORKS AREA

Business Name	Employees
Ideal Cement Plant	103
Cyprus Industrial Minerals Company	50
Cherry Lane Egg Company	22
Kanta Cement Products	18
G.T.A. Elevators	13

Future employers should also be added to this list:

Business Name	Employees
Nicore Minerals New Talc Plant	60
Edson Express Freight Transfer Terminal	15
Model Log Homes Log Home Company	40

SUMMATION

Three Forks has traditionally been a self sufficient community from its early "Toll Bridge" days to the present. The cities varied economic base has been the reason it could survive the pull out of a major industry such as the Milwaukee Railroad and continue to grow. The growth projections for the city, as well as for the county (see Illustration 5), show a modest increase in the coming years.

Most of the local industries fluctuate up and down with the economy of the rest of the nation such as in agriculture. Ideal Cement seems to work this way also, although the company trying to redefine its business priorities the Trident plant remains profitable.[25] Additionally the new businesses mentioned will help to diversify the communities industrial base even more as well as boosting the local service industry.

Stability is reflected in the census data through nativity statistics, housing age, housing vacancies, etc. It can also be seen by noting the amount and

complexity of public services, public buildings, paved roads, annual social events, and so on. The city has recently adopted a zoning ordinance basd on the recommendations of its master plan showing an interest as to what direction local growth will take. Using this as a guage, Three Forks has been, and is continuing to be, a planning concious, stable community.

THE PATIENT NEEDS

PLANNING ISSUES

When pursuing sources of information concerning potential demand for medical facilities, or concerning the development of medical facility programs, several planning goals should be kept in mind:

- To do a better job in planning so that facilities will be ready with the building space and personnel required when the need arises.
- To predict community needs five to ten years ahead in order to permit intelligent development efforts.
- To increase our sensitivity to the need for facilities which will respond to changes in health care delivery.
- To reinforce the emphasis in planning so that the responses of a facility to community needs are more thoroughly tested in the design phase.

Observance of these goals leads to a more sensitive and responsive design process which benefits the community, practioner, and the patient.[1]

HOSPITAL INVENTORY

The following is a list of area hospitals, their size, utilization data, and services which they provide (see Illustration 24).[2]

Definitions:

Admissions - number of patients accepted for inpatient service during a 12-month period.

Census - average number of inpatients receiving care each day during a 12-month period.

Occupancy - ratio of average daily census to average number of beds maintained during a 12-month period.

Bozeman:

Bozeman Deaconess Hospital
138 Total Beds (60 Bed Nursing Home)
4,661 Admissions
47 Census
73.9% Occupancy

Livingston:

Livingston Memorial Hospital
46 Beds
1,645 Admissions
21 Census
45.7% Occupancy

White Sulpher Springs:

Mountain View Memorial Hospital
37 Total Beds (31-Bed Nursing Home)

Hospital
155 Admissions
1 Census
-- Occupancy

Nursing Home
200 Admissions
31 Census
83.8% Occupancy

Helena:

St. Peters Community Hospital
111 Beds
5,336 Admissions
151 Census
61.3% Occupancy

Townsend:

Broadwater Community Hospital
21 Beds
213 Admissions
2 Census
9.5% Occupancy

Butte:

St. James Community Hospital
274 Beds
8,000 Admissions
151 Census
55.1% Occupancy

Deerlodge:

Powell County Memorial Hospital
35 Beds
758 Admissions
11 Census
31.4% Occupancy

Dillon:

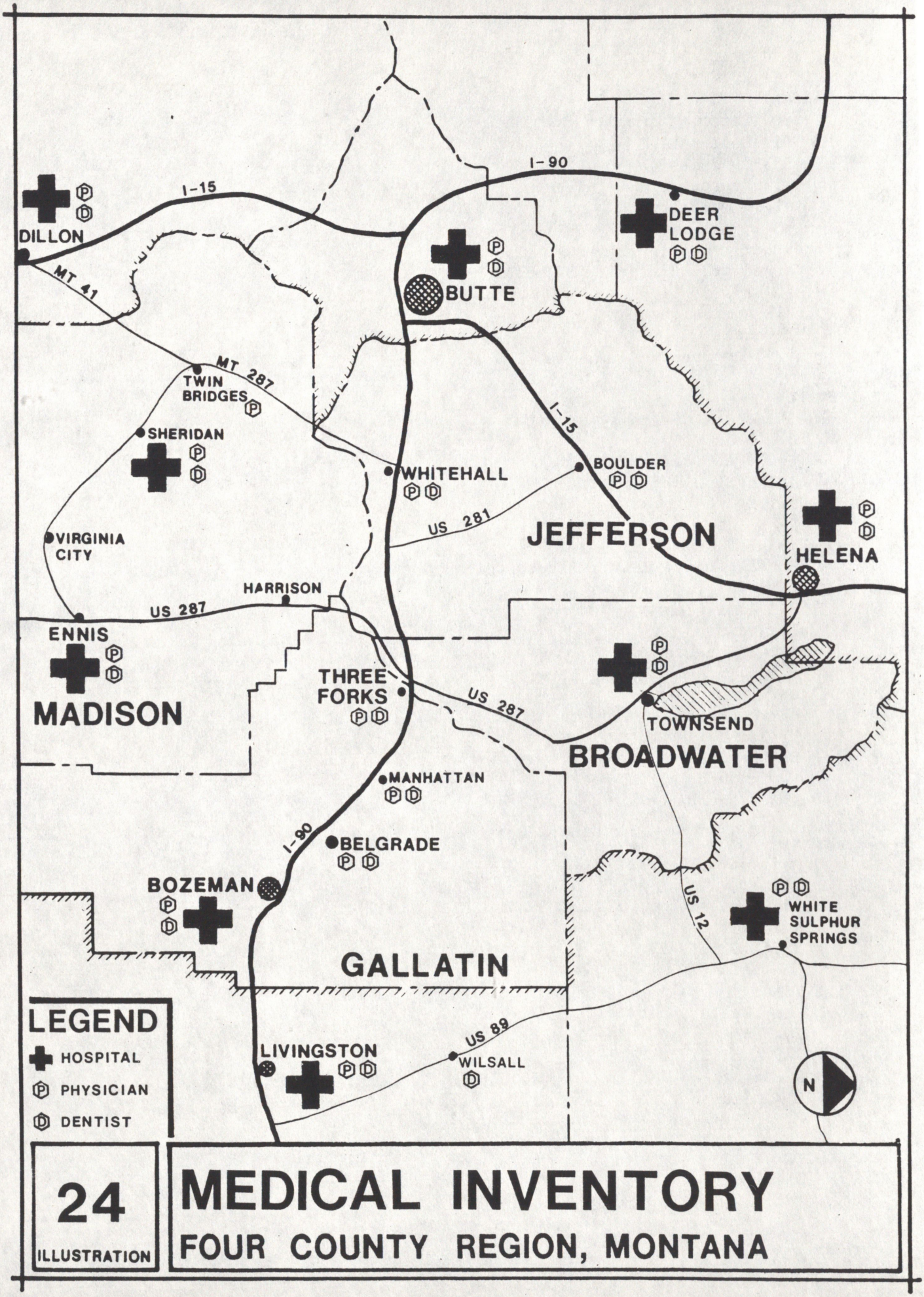
Barret Memorial Hospital
31 Beds
884 Admissions
11 Census
35.5% Occupancy

Ennis:

Madison Valley Hospital
11 Beds
353 Admissions
4 Census
36.4% Occupancy

Sheridan:

Ruby Valley Hospital
20 Beds
375 Admissions
3 Census
15% Occupancy


I-90
I-15
DILLON
MT 41
DEER LODGE
BUTTE
MT 287
TWIN BRIDGES
SHERIDAN
I-15
WHITEHALL
BOULDER
US 281
JEFFERSON
HELENA
VIRGINIA CITY
HARRISON
US 287
ENNIS
MADISON
THREE FORKS
US 287
TOWNSEND
BROADWATER
MANHATTAN
I-90
BELGRADE
BOZEMAN
US 12
WHITE SULPHUR SPRINGS
GALLATIN
LEGEND
HOSPITAL
PHYSICIAN
DENTIST
LIVINGSTON
US 89
WILSALL
N
24
ILLUSTRATION
MEDICAL INVENTORY
FOUR COUNTY REGION, MONTANA

	BOZEMAN	LIVINGSTON	WHITE SULPHUR SPRINGS	HELENA	TOWNSEND	BUTTE	DEER LODGE	DILLON	ENNIS	SHERIDAN
1. Ambulatory Surgery Services	●	●		●		●	●	●		
2. Intensive Care Unit (cardiac)			●							
3. Intensive Care Unit	●	●		●		●	●	●	●	●
4. Open Heart Surgery Facility										
5. Pharmacy	●	●	●	●	●	●	●	●	●	●
6. Ultrasound			●	●		●				
7. X-Ray Radiation Therapy	●	●		●						
8. Megavoltage Radiation Therapy										
9. Radioactive Implants										
10. Diagnostic Radioisotope Facility	●	●		●		●				
11. Therapudic Radioisotope Facility										
12. Histopathology Laboratory	●			●		●				
13. Organ Transplant										
14. Blood Bank	●	●	●	●					●	
15. Health Promotion										
16. Respiratory Therapy Services	●	●		●	●	●	●	●		
17. Premature Nursery	●			●		●				
18. Self Care Unit										
19. Skilled Nursing or other Long-Term Care Unit			●							
20. Hemodialysis				●						
21. Hospice				●		●				
22. Burn Care Unit										

	BOZEMAN	LIVINGSTON	WHITE SULPHUR SPRINGS	HELENA	TOWNSEND	BUTTE	DEER LODGE	DILLON	ENNIS	SHERIDAN
23. Physical Therapy Services	●	●		●	●	●	●	●		
24. Occupational Therapy Services	●									
25. Rehabilitation Inpatient Unit										
26. Rehabilitation Outpatient Services										
27. Psychiatric Inpatient Unit						●				
28. Psychiatric Outpatient Services										
29. Psychiatric Partial Hospitilization Program										
30. Psychiatric Emergency Services	●		●			●				
31. Psychiatric Foster and/or Home Care Program										
32. Psychiatric consultation and Education service										
33. Clinical Psychology Services	●					●				
34. Organized Outpatient Department	●			●						
35. Emergency Department	●	●	●	●	●	●	●	●	●	●
36. Social Work Services	●					●				
37. Family Planning Services			●							
38. Genetic Counseling Services										
39. Abortion Service	●			●						
40. Obstetrics	●	●	●	●	●	●	●	●	●	●
41. Home Care Program			●							
42. Dental Services			●							
43. Podiatric Services							●			

	BOZEMAN	LIVINGSTON	WHITE SULPHUR SPRINGS	HELENA	TOWNSEND	BUTTE	DEER LODGE	DILLON	ENNIS	SHERIDAN
44. Speech Pathology Services	●	●	●			●				
45. Hospital Auxiliary		●		●	●	●	●	●		●
46. Volunteer Services Department	●			●						
47. Patient Representative Services	●									
48. Alcoholism/Chemical Dependency Inpatient Unit						●				
49. Alcoholism/Chemical Dependency Outpatient Unit										
50. Chronic Obstructive Pulmonary Diseases Unit										
51. Neonatal Intensive Care Unit						●				
52. Pediatric Inpatient Unit	●		●		●	●	●	●		
53. CT Scanner						●				
54. Cardial Catherization Laboratory										

PHYSICIAN, SPECIALIST, AND DENTIST INVENTORY

The following is a list of physicians, specialists, and dentists in and around the Three Forks area (see Illustration 24).

Belgrade: 2 physicians
1 dentist

Boulder: 1 physician, and 1 specialist
2 dentists

Bozeman: 69 physicians and specialists
36 dentists and dental specialists

Butte: 59 physicians and specialists
30 dentists and dental specialists

Deerlodge: 9 physicians
3 dentists

Dillon: 8 physicians and specialists
8 dentists

Ennis: 1 physician and 1 specialist
1 dentist

Helena: 78 physicians and specialists
33 dentists and dental specialists

Livingston: 12 physicians and specialists
11 dentists and dental specialists

Manhattan: 2 physicians
1 dentist

Sheridan: 2 physicians
1 dentist

Three Forks: 1 physician
1 dentist

Townsend: 5 physicians
2 dentists

Twin Bridges: 1 physician

White Sulphur Springs: 2 physicians
1 dentist

Whitehall: 2 physicians
1 dentist

Wilsall: 1 dentist

AMBULANCE SERVICE

Three Forks has an emergency ambulance provided by Halls Emergency Service of Bozeman. The vehicle is kept at the fire department.

Depending on the location and the type of accident, the travel time from Three Forks to the Bozeman Hospital is about 30 minutes.

The director of the ambulance crew, Reverend Richard Gay, states that they receive calls for pretty much the entire spectrum of injuries. The crew handles problems from vehicle accidents to ailments of the elderly.

The vehicle averages about one run a week and has the following recent history of use.

1983	47 runs
1984	72 runs
1985	60 runs
1986 to March 1	15 runs

GAPS AND SURPLUSES IN EXISTING HEALTH CARE

The health care system in the area surrounding Three Forks seems to be more than adequate for treatment options and patient load. Areas of hospital care which are not provided are for the most part not in demand or would not receive enough use to pay for themselves.

People in small communities such as Three Forks must travel for miles to be admitted for inpatient care. In most cases this works out alright, people don't mind the drive and there is no real hurry. As the occupancy rates point out, the major hospitals are the busiest with the minor facilities receiving little use. However, when the weather is bad and time is crucial, there seems to be no option for initial medical treatment in a small town other than the back of an ambulance.

There also appears to be a surplus of physicians in the region, primarily in larger communities such as Helena, Bozeman, and Butte. Some specialists occasionally do general practice work to help make ends meet which takes work away

from the general practioners.[3] There is not enough of a population to support all the people who want to live there.

HEALTH CARE DEMAND PER SOCIO-ECONOMIC GROUP

There are so many variables involved here that an accurate prediction is hard to justify. In such case, the following assumptions are posed in the hope that discussion will clarify the validity of such claims.

Elderly citizens frequent physicians more often than the young or middle-aged.[4] Three Forks has a slightly older population than the rest of the surrounding area or state.[5]

Those families with health insurance would seek health care more often than those without.[6] Almost all of the patients seen now by Dr. Bertagnolli and by Dr. Durham have some form of health insurance.[7]

People with a high education level vist physicians more regularly than those with a lower educational background.[8] Roughly three quarters of the population in Three Forks and the surrounding area have graduated from high school.[9]

The rural population seeks medical attention less often than the urban

population.[10] The Three Forks health center would have most of its patients from surrounding communities.

There seem to be no predominate health problems in the three Forks community. No major ailments from industry, or environment exist within the population which could justify a specialty health program.[11] People tend to put off seeing a doctor or shop around during slow economic times, but the family practice physician seems best suited for the area.

SUMMATION

The Gallatin Valley region contains major facilities which are able to meet most medical conditions of patients in the area. Cities to the north, south, east, and west of Three Forks contain large modern well-equipped hospitals. Inpatient care seems to be no problem for the area as major population centers lie within an average of an hours drive. The majority of specialists make their homes in Butte, Bozeman, and Helena while smaller towns all have their local physician.

Services not provided by hospitals in the region might possibly be provided at a facility in Three Forks, although an organ transplant program would be questionable, counseling services, or health education and promotion programs could be rotated in or even headquartered in Three Forks. The cities central location in a large rural region could be used to develop programs focused at the rural community.

THE PHYSICAL PLANT

PROPOSED SOLUTION

The problem in the Three Forks area is that there has been a lack of planning for growth in the health care field as opposed to that of other community services. Presently health care is offered in independent medical offices in town or at major hospitals some distance away.

The potential for a medical facility exists. Three Forks is a stable, self-sufficient community located at a major crossroads of traffic in the state. The areas population and economy are of sufficient size and strength to support community health care. Such a facility can meet the areas immediate needs as well as hold a reasonable prospect for future expansion.

A **Community Care Center** located in Three Forks would provide the following services:

1. Two family practice physicians (an assumption is made that the local doctor would be taking on an assistant.)

2. A dentist practicing general dentistry

3. A small pharmacy.

4. A minor surgery room for lacerations and fractures.

5. Space for visiting specialists.

As the city grows, possibilities will develop for expansion towards an ambulatory rural health center, maybe even toward a limited inpatient capability.

CONDITIONS AND ISSUES SHAPING THE SOLUTION

A number of issues arose when initial planning began and were considered in possible solutions.

-Would Three Forks be able to support a small hospital? Judging by the occupancy rates for the small hospitals in Townsend and Ennis (9.5% and 36.4%)[1] and comparing that with those in Bozeman, Helena, and Butte (73.9%, 61.3%, and 55.1%),[2] one would conclude that when people do require inpatient therapy they chose one of the larger, better equipped facilities. Unless Three Forks were to establish a retirement community or nursing home, a small hospital would have a rough time financially.

-In the case of an emergency, would it be feasible to stabilize the patient in Three Forks so as to move him to an inpatient facility when time was less crucial? The diagnostic equipment would not generate enough use to be economically favorable. Also there is a matter of attracting trained

personnel to the community for emergency room work and would the demand be enough to enable them to make a comfortable living? Finally, there seems to be a thought among physicians that it is best to get the patient to the proper facilities first and not to make several stops for treatments.

-Could an obstetrics program be offered? We are again talking about how to attract a specialist to live and work in Three Forks. What can the city offer compared with others in the state? What patient load and salary? Trained personnel are required for the sake of the liabilities involved with possible malpractice suits in the areas of obstetrics and emergency proceedures.[3]

-Could a program whereby a specialist would be in town on a once a week basis to treat people be set up so as to save driving to a hospital? This idea can work, but it involves a bit of a sales pitch to the specialist. Why should he go out to the patients

when they are coming to him? Convincing him of increased business or other incentive is needed to establish such a venture.

FUTURE GROWTH

As the city grows and prospers, futher planning will be needed to be able to meet future needs. A facility plan will have to be developed to establish a policy and a direction for expansion.

Initially, the facility may wish to obtain more diagnostic equipment, maybe more lab equipment so as to offer more services.

As the patient load increases, additional exam and treatment space would be needed, possibly more medical assistants.

With an increase in community size and tourist traffic, it may be possible to establish an emergency department, possibly an ambulatory surgical service also.

Finally, a possible elderly housing project nearby could have a direct link in helping to establish a limited inpatient capability.

FACILITY USE

The potential for immediate use is based largly on the existing patient loads of Dr. Durham[4] and Dr. Bertagnolli.[5] Patients are drawn to Three Forks from Areas such as Whitehall, Townsend, and Manhattan, which have local physicians. Harrison, Willow Creek, Logan, Trident, and other small communities also contribute to the patient load.

With a planned approach to community health care, older citizens could receive some of the treatment they need in Three Forks and not be forced to drive, or even move, to Bozeman. The care center could possibly be used as an extension of Bozeman Deaconess to enable the cities elderly citizens to remain in Three Forks.

Family care is still the major demand in the area. Routine checkups and sports physicals will probably make up the patient lists for some time to come.

FACILITY FUNCTION

The Three Forks Community Care Center will function as a professional building for the treatment of routine medical and dental problems. The facility can handle minor emergencies and dispense perscriptions thru the pharmacy. In the case of tourist emergencies the center can treat simple problems or provide the organization and information needed to handle major ones.

In the case of a community disaster such as a flood or an earthquake, the care center would dispense material, treat victims, provide shelter, and in general, become the focal point for the organization of disaster relief.

CASE STUDIES

The building type which I propose is springing up with such rapidity that it hasn't found a real name yet. Some have been labeled treatment facilities, others emergency clinics. The facility attempts to respond to community concerns about cost and convenience of health care. Minor household and childhood injuries can be taken care of for less cost than hospital emergency room fees. There is also a possibility of functioning as an outpatient clinic, again reducing the cost of health care to the consumer.

Most hospitals must equip and staff their emergency rooms for the serious medical emergencies like coronaries and compound fractures. In addition, the restructuring of medicare payments by the Federal Government has forced hospitals to rely less on impatient care. This solution can answer the financial needs of practitioners and hospitals as well as that of the patient.

In order to be successful, the facility must be up to the minute in

architectural style and form. It must reflect professional ability and progressive ideas, as well as provide a comfortable atmosphere for patient/physician relationships.

Several recent examples of this building type can be found in the October, 1985 issue of Architectural Record, pages 128 and 132. The first, called "Treatment Center", was designed by Goodman Architects in Jackson, Mississippi. The center is 2,600 square feet in size and cost $142,500.

A second example is the "Merrit Island Medical Center", designed by Hansen, Lind, Meyer, Architects in Merrit Island, Florida. This wood framed 4,500 sq. ft. building has an out-patient clinic at one end and physician's offices at the other.

These two examples represent an approach to Medical Design which reflects the needs of the community, rather than one which perpetuates existing design stereotypes.

SUMMATION

The creation of a Community Care Center in Three Forks will contribute to the sense of permanence of the city in the same way as does a school, a library, and a museum. This sense of permanence is attractive not only to the population of the city, but also to outside business looking for an area to locate. Community health care is another step in creating a more self-sufficient city.

DESIGN DATA

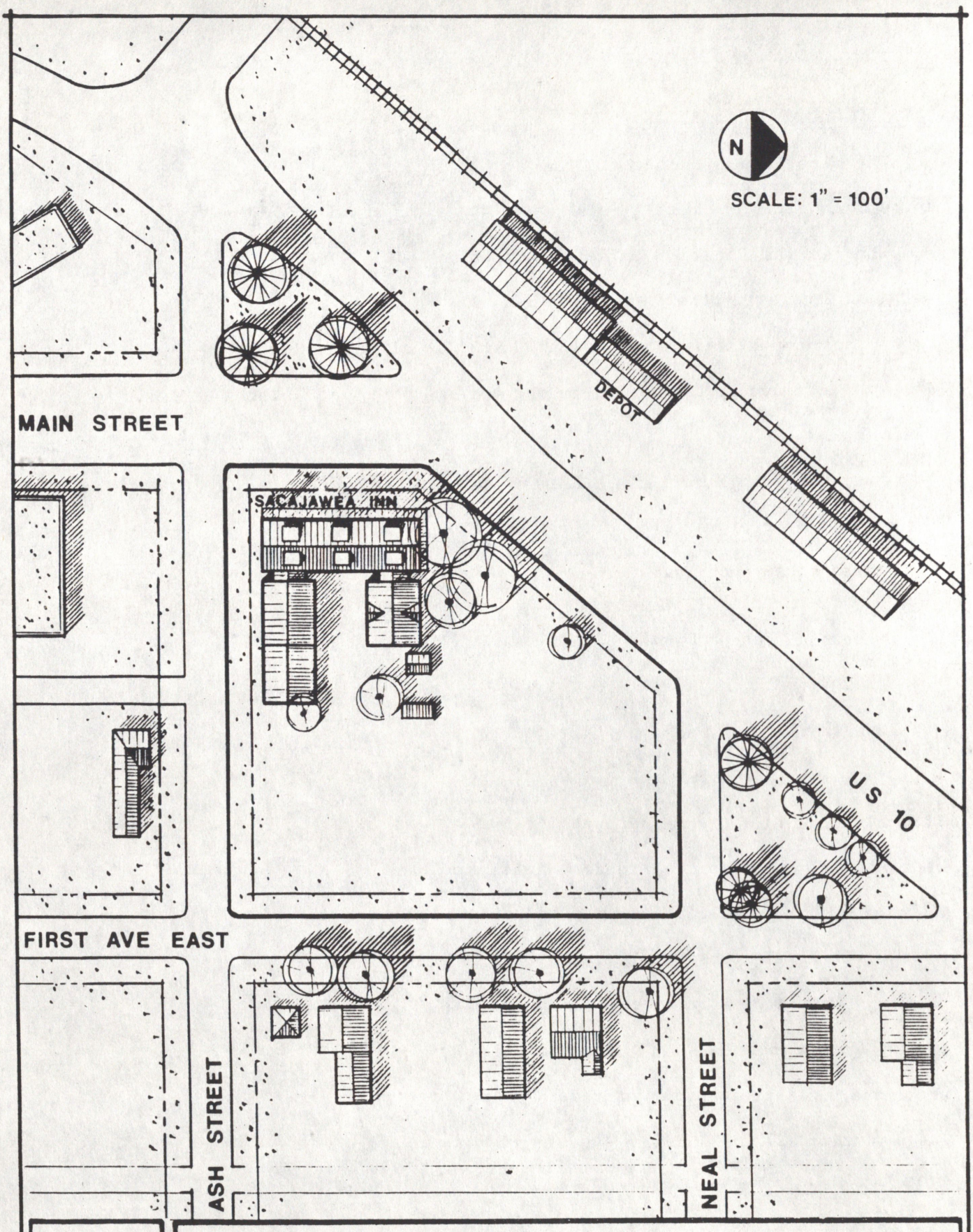
SITE LOCATION AND ANALYSIS

The site I have chosen for the Three Forks Community Care Center is situated in a north central location on a lot shared with the Sacajawea Hotel (see Illustration 25). The property is bordered by Main Street, First Avenue East, Ash Street, and Neal Street.

When choosing a building location on the site, some factors to consider are:

Access to Automobiles
Access to Pedestrians
Flood Plain
Commercial Encroachment
Wind
Solar Gain
Noise
Expansion
Slope
Prominence of Position

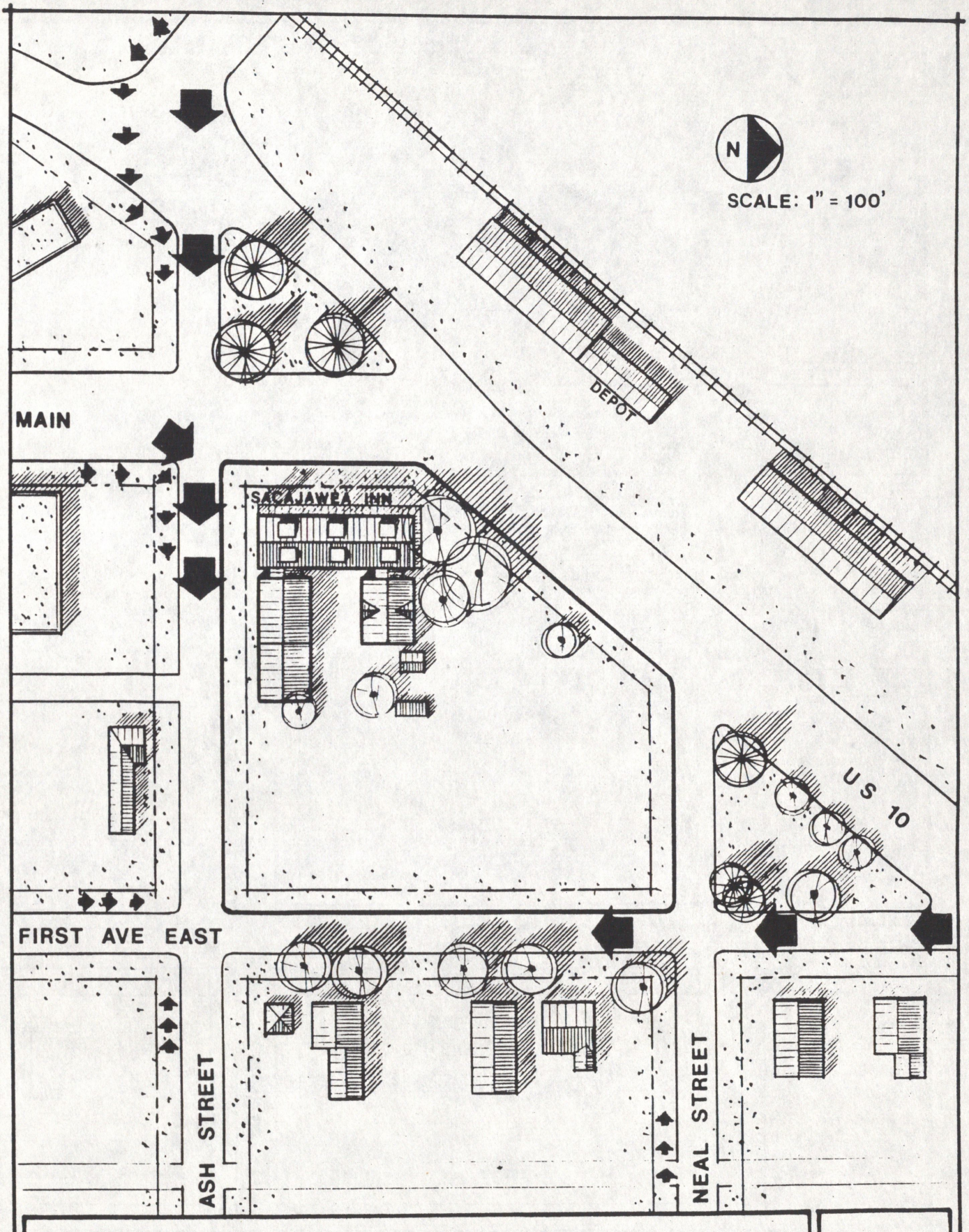
This block is at the northern end of the central business district and immediately accessable from the main road in and out of town (see Illustration 26). In addition to the sites' easy access for pedestrians and automobiles, half of the lot is above the flood plain high water mark (see Illustration 27). Locating a medical center here would enable it to be used in flood emergencies as a relief operations center as well.



25
ILLUSTRATION

SITE PLAN

THREE FORKS, MONTANA

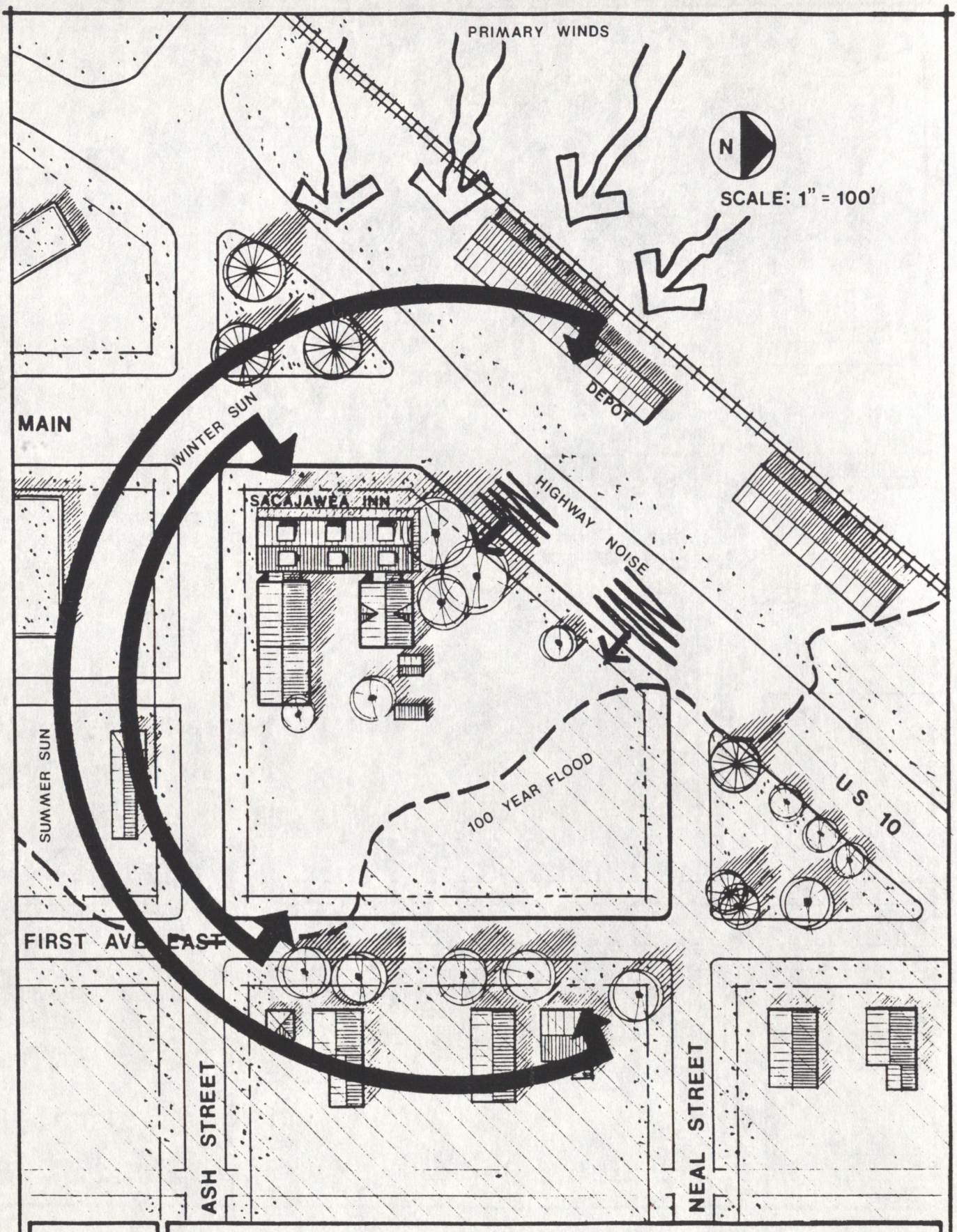


TRAFFIC

THREE FORKS, MONTANA

26

ILLUSTRATION



27

ILLUSTRATION

ENVIRONMENT

THREE FORKS, MONTANA

Further commercial encroachment is limited by the zoning ordinance and most of the towns existing major industries are located south of the city limits. The character is that of a residential neighborhood with plenty of trees, houses, and park-like vacant lots. The Sacajawea Hotel, despite it's size also reflects a residential character with its gabel roof, wood siding, and large front porch.

Wind comes predominantly from the west to northwest, as can be seen from the climate data, and should be considered when planning entries and circulation. The Sacajawea Hotel can throw a long shadow, a careful analysis of solar potential should also be considered. Due to the northern temperatures and the nature of the facility, an increased amount of insulation should be considered so as to be able to keep thermostats set at a somewhat higher temperature than normal for patient examinations and the like.

Sound is not a major problem as the industries are on the other side of town and the traffic on main street is usually not that heavy.

The site is large enough for adequate parking and allowances for future expansion programs. It will remain in a north central position with respect to town growth and adjacent vacant land could possibly be used for elderly housing. The lot itself slopes very little and contains few trees.

Finally, situated in a prominent position, the community care center will enhance the sense of stability of Three Forks, as well as encourage facility use.

STAFF AND DEPARTMENT RELATIONSHIPS

A facility such as a community care center can benefit through the sharing of certain personnel and building space. Staff such as a receptionist, a custodian, and an office manager can be utilized by both the medical and dental professions, as well as can sharing a waiting room and conference room.

What follows is a list of proposed staff and brief job descriptions of each.

2-Family Practice Physicians
- Medical Care and Treatment

1-Registered Nurse
- Preliminary Patient Care
- Assist Physicians

1-Dentist
- Dental Care and Treatment

1-Hygienist
- Preliminary Patient Care
- Assist the Dentist

1-Pharmacist
- Preparing and Dispensing Pharmaceuticals

1-Receptionist
- Organizing Appointments
- Preparing Records

1-Office Manager
- Patient Billing
- Ordering and Bookkeeping

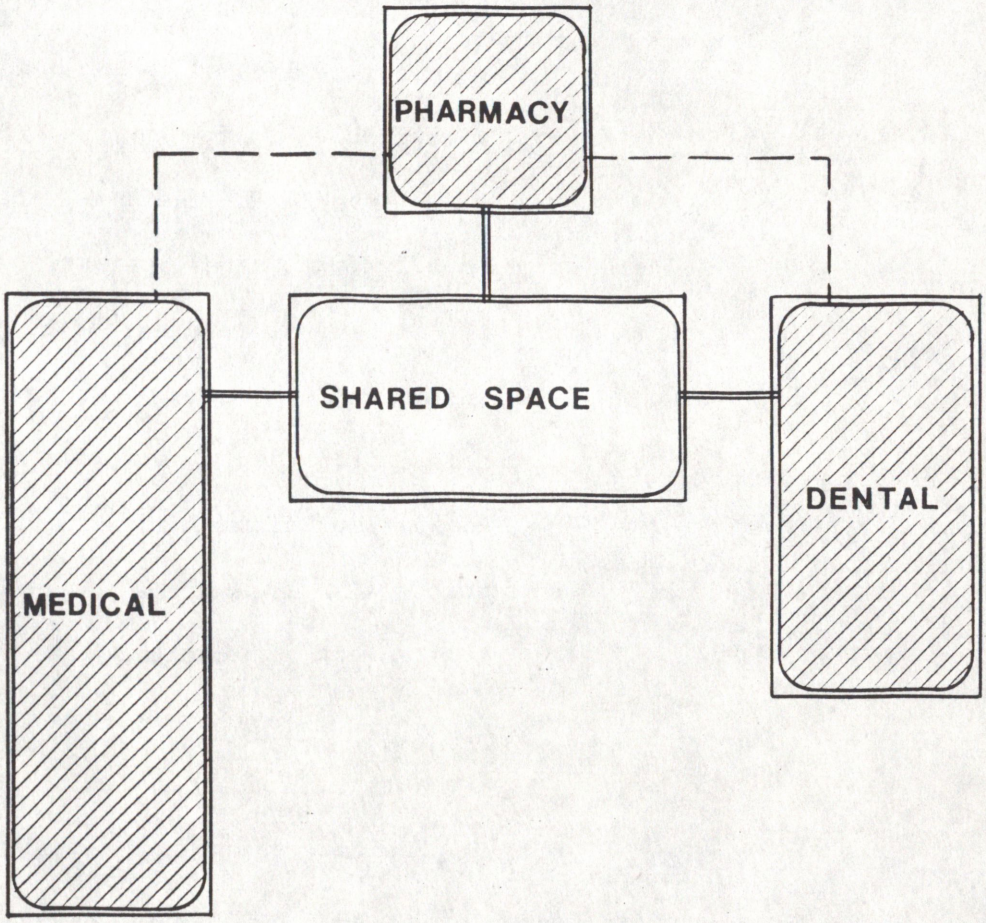
1-Maintenance Custodian
- Clean Up
- Routine Maintenance

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9 Total Personnel

-Visiting Specialist
- Psychology, Physical Therapy, etc.
- Special Program Work

The Dental, Medical, and Pharmacy Departments are opperated independently of ane another, although they share certain spaces and personnel (see Illustration 28). The pharmacy will have occasional contact with the medical and dental staff when supplying medicene. The design of this facility should protect the integrity of these departments in order not to create confusion or traffic congestion.



DEPARTMENTS

COMMUNITY CARE CENTER

28

ILLUSTRATION

DEPARTMENT SPACE RELATIONSHIPS

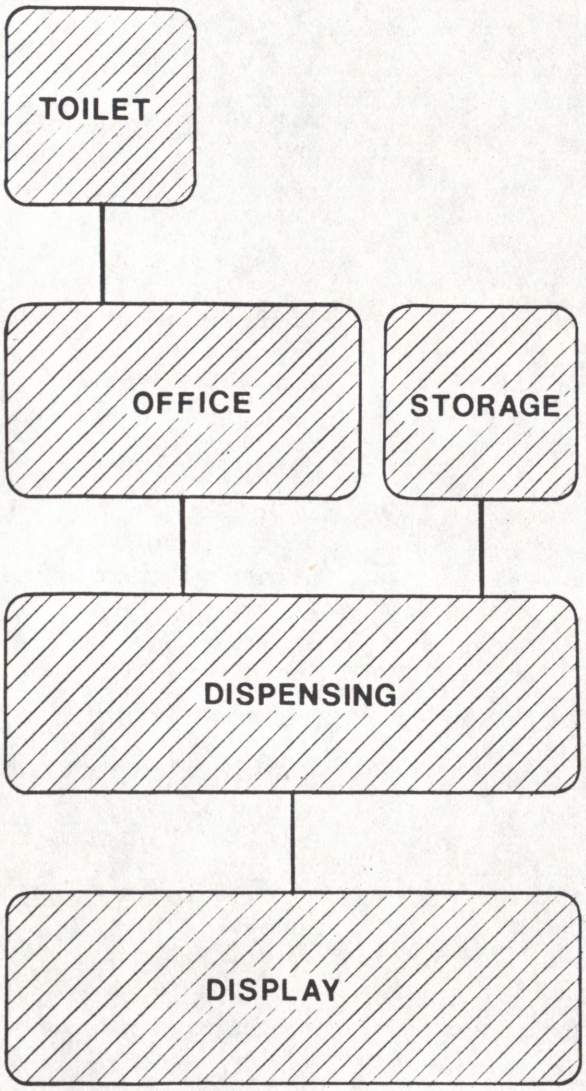
Of all the patients using the medical department, it is estimated that two-thirds of these will receive a perscription for some form of medication. If a pharmacy is located in the building with a comfortable waiting room so that patients will pass it on their way out, approximately 70% of these perscriptions will be filled here as a matter of convenience.

A small pharmacy requires an 8 inch raised floor behind a 5 foot high security counter for dispensing. The office should enable the pharmacist to watch the front counter and a private toilet is needed so as to avoid having to leave the immediate area (see Illustration 29).

Patients using the dental department would experience the following typical procedure for treatment:

Arrival/Reception/Waiting/Hygienist/
Dentist/Business/Departure

Upon entering the patient would check in with the receptionist who would notify the hygienist of arrival. After experiencing the waiting room, the hygienist



PHARMACY SPACE

COMMUNITY CARE CENTER

29

ILLUSTRATION

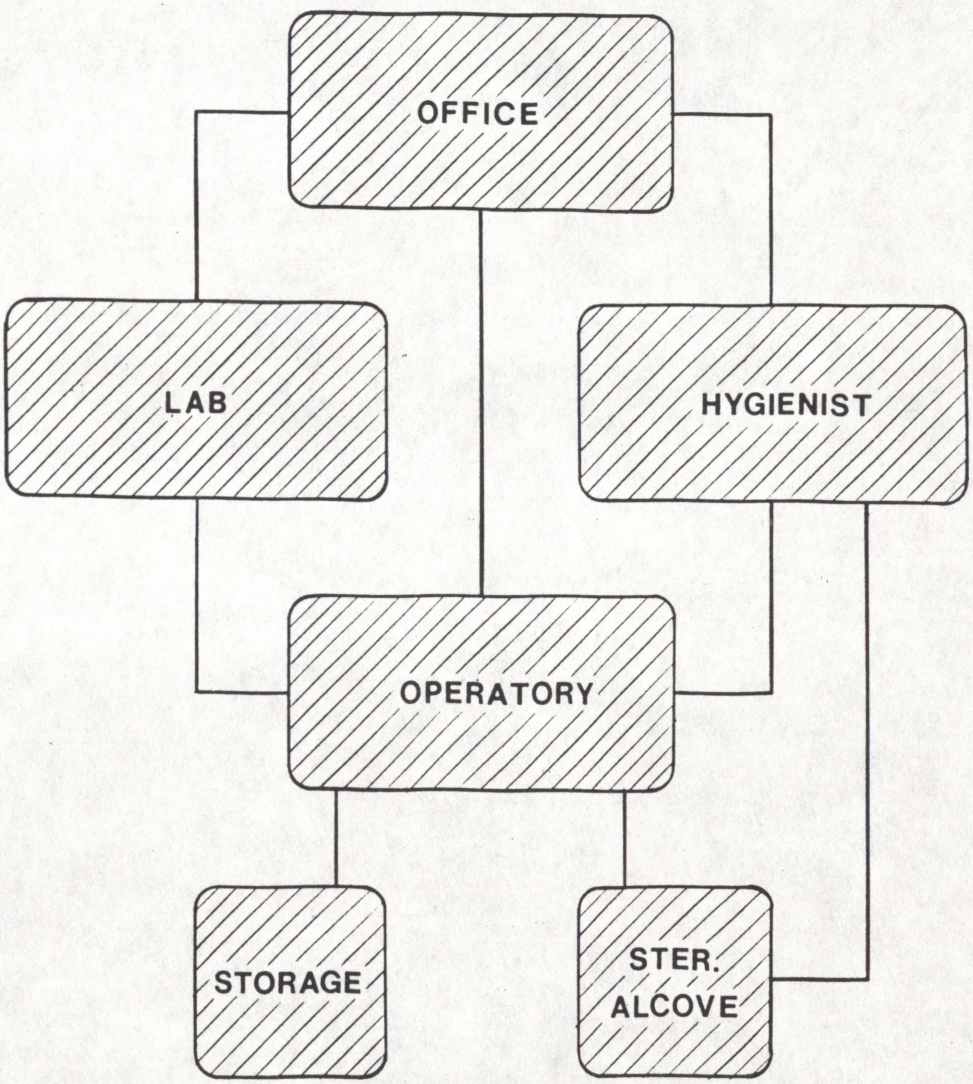
would take the patient in for X-rays and teeth cleaning. Once this has been accomplished, the dentist makes his examination and recommends treatment. The hygienist then leads the patient to the business office for payment or further appointments and the patient departs.

Design of the dental department involves control of patient traffic and creating areas of semi-private space for staff work (see Illustration 30).

Patients using the medical department would experience the following typical procedure for treatment:

Arrival/Reception/Waiting/Nurses Station/Exam/(X-Ray, Treatment Room)/ Business/Departure

Upon entering, the patient would check in with the receptionish who would notify the nurse of arrival. After a brief stay in the waiting room, the nurse records the weight and height of the patient, takes a blood and urine sample, and leads the patient to the exam room. The doctor then begins his examination which could possibly involve X-rays or minor surgery in



DENTAL SPACE

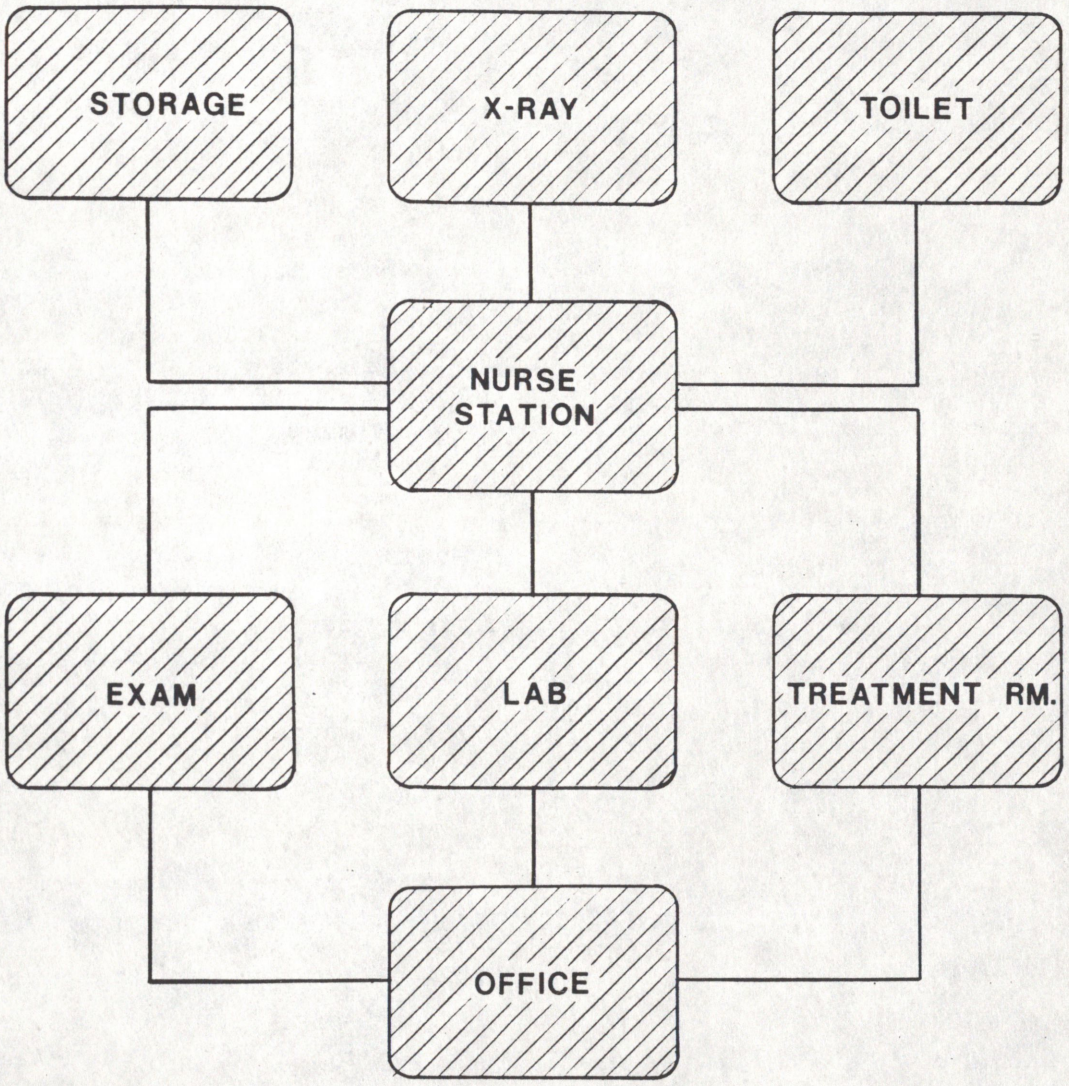
COMMUNITY CARE CENTER

30

ILLUSTRATION

the treatment room. With the exam completed, the nurse takes the patient to the business office for payment or to schedule further appointments. The patient then departs.

Design of the medical department also involves control of patient traffic and creating areas of semi-private space for staff work (see Illustration 31).



MEDICAL SPACE

COMMUNITY CARE CENTER

31

ILLUSTRATION

SPACE PROGRAM (see Appendix C)

SHARED SPACE:		
Waiting	380	
Reception	162	
Business Office	128	
Conference Room	120	
Housekeeping	22	
Mechanical Room	100	
Toilet	30	
	982	sq. ft.
MEDICAL:		
Exam (96 ea x 5)	480	
Nurse Station	120	
X-Ray	210	
Treatment Room	144	
Laboratory	100	
Office (102 ea x 2)	204	
Storage	75	
Toilet	30	
	1363	sq. ft.
DENTAL:		
Operatory (120 ea x 2)	240	
Hygienist	120	
Sterilization Alcove	40	
Laboratory	120	
Office	124	
Storage	30	
Toilet	30	
	704	sq. ft.
PHARMACY:		
Dispensing	150	
Display	126	
Office	105	
Storage	30	
Toilet	30	
	441	sq. ft.
TOTAL:		
Shared Space	982	
Medical	1363	
Dental	704	
Pharmacy	441	
	3490	sq. ft.
Circulation	1255	sq. ft.
Structure/Partitions	771	sq. ft.
TOTAL:	5516	sq. ft.

CODE RESTRICTIONS

The following design information was taken from the 1985 Uniform Building Code, the 1985 Life Safety Handbook, and the Three Forks Zoning Ordinance.

Although this particular building type could possibly qualify as a Doctor's Office, the designer must also keep in mind a growth plan which could culminate in an ambulatory care center.

Type of Occupancy: Group B, Division 2
Type of Construction: Type II F.R.
Basic Allowable Floor Area for Buildings one Story in Height: 39,900 sq. ft.
Maximum Allowable Height of Building: 12 Stories
Occupant Load: No less than one person per 100 square feet of gross floor area
Capacity of Means of Egress: 30 persons/exit unit
Minimum Hospital Corridor Width: 8'-0"
Minimum Corridor Width: 44"
Number of Exits: No less than two
Length of Dead End Corridor: 20 feet max.
Length of Common Path of Travel: 50 feet max.
Travel Distance to Exits: 150 feet max.
Exit Doorway: 3 feet wide min.
4 feet wide max.
Classification of Hazard Contents: Ordinary One Hour Rated Interior Walls: Corridor
Mechanical Room
Housekeeping Closet
General Storage
Laboratories
Automatic Sprinkler System: Medical Gas Storage
Allowable Zoning Locations: NHB and CBD
Lot Area and Width: No minimum requirement

Lot coverage: May cover entire lot
Yard Requirements: 15 foot front yard setback required on all streets except Main Street
Building Height: No maximum
Parking Space Size: 9 x 18 minimum
Parking Screening: Over 3500 sq. ft. must have 2% of gross parking landscaped with trees or shrubs
Required Parking: 14 spaces, paved lot

DESIGN CONSIDERATIONS

Psychological

The psychological design of a medical center affects the degnity of the patient, the comfort of the staff, and the reputation of the facility. The environment should promote health rather than aggravate illness and feed anxiety.

Patients enter the building full of concerns about pain, possible separation from family, and possible changes in lifestyle. These concerns help create an increased awareness of the physical environment. Color, noise, odors, lighting, and air temperature are all amplified.

The waiting room is the patients introduction to the office. It is important to establish an immediate rapport between the building and the patient, putting the patient at ease so that the life functions (pulse, blood pressure, etc.) are normal prior to any examination. The room reflects the doctor's attitudes, it should present a conservative image, not impulsive, indicating a serious person.

Color should be used carefully, blue tends to slow respiration while yellow reflects on a patient's skin tone hindering proper diagnosis of any ailment. Intense colors or busy wall coverings should be avoided.

Simple, uncomplicated spaces are best. They should signal their intended use to a vistor, appear friendly, and preserve human dignity.

When kept ignorant or unoccupied, waiting breeds hostility. There should be enough visual environment to put the patient at ease. Windows serve as a psychological escape route as well as provide a view. Doors can be closed for privacy, but should be kept open most of the time (as for dental operatories) as a patient feels less apprensive when not closed up in a small room. Even something such as a suspended ceiling mobile that a dental patient can see while reclined can provide a distracting diversion from the examination.

Designing with the patients' concerns in mind can create a pleasant experience

for the patient and an increased use for the facility.

Handicap

The following design criteria was taken from the 1980 American National Standards Institute Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.

Minimum Clear Width for Single Wheelchair: 36 in.
Minimum Clear Width for Two Wheelcharis: 60 in.
Wheelchair Turning Space: 60 in. min. diameter
Minimum Clear Floor Space for Wheelchairs: 30 in. x 48 in.
Maximum Ramp Slope: 1:10
Sides of Ramp: 1:10
Minimum Clear Doorway Width: 32 in.
Maneuvering Clearance at Doors: 24 in.
Two Hinged Doors in Series: 48 in. door to wall
Grab Bars at Water Closets: 36 in. max. height

Seismic

Principles of seismic design require:

- -collapse be avoided
- -oscillations of building damped
- -damage to both structural and non-structural components are minimized.

Non-structural components, such as walls, are likely to be stiffer than structural framing, and therefore subject

to greater seismic forces and damage. As such gaps between adjoining building components, not required to be rigidly connected together, should be provided to permit sliding between such components. Thus partitions and windows that are free to move in their frames occur little damage in the event of an earthquake.

Three Forks is located in a seismic zone three area which corresponds to an intensity of VII on the Modified Mercalli Intensity Scale. Intensity VII is defined as: "Everyone runs outdoors. Damage of buildings is negligible to slight, depending upon quality of construction. Noticeable to drivers of automobiles."

Flood Plain

Major objectives of floodproofing are:

- -protect fully buildings and contents from damage from a 100 year flood
- -reduce loss from more devastating floods
- -lower flood insurance premiums

On sites located on a floodplain it may be feasible to raise the structure above flood level by building up an earth fill, with embankments to protect against erosion by water.

An alternative would be to raise the building by building it on piers. As such utilities and communications should also be protected from rising water.

Structures for which neither case is acceptable should be furnished with an impervious exterior. Openings for doors can be protected with a moveable flood shield which can be stored away when not in use.

Further flood protection involves:

- -Mechanical and electrical equipment should be located above flood level
- -Install auxiliary generators for emergency power
- -Install pumps to eject water that leaks into the building
- -If the building is not to be evacuated, install an emergency water supply and cutoff valves on the sewer lines to prevent backflow.

Energy

Three Forks is located in a cool, moderately windy northern climate. As such, window treatment should be handled carefully so as to balance the human psychological need with the economics of heat loss. In addition, the nature of a medical facility involves a large amount of

privacy for both the patient and the staff.

Forms of passive solar heating could be attempted in the building design, but bright, direct sunlight on waiting room patients should be avoided. Solar energy in the form of hot water heating could be used if it can be proved it will provide an adequate supply and be financially attractive.

Insulation and quality construction provide the best energy conservation measures. Recommended R-values for the area are: R-38 ceiling, R-19 wall, and R-22 floor.

Other measures such as planting evergreen trees to form a windbreak, using an air lock type entry, and limiting north facing glazing will add to the energy saving.

Speciality Equipment

The medical facility requires consideration in its design for the use and requirements of special equipment in areas such as X-ray, laboratories, operatories, treatment room and darkrooms.

The X-ray room and hygienist operatory require lead shielding in the interior walls and door for the protection of the staff from radiation scatter. A 9 foot ceiling and a wide doorway is needed because of the size of the equipment (which is usually replaced by new machines every 5-10 years)

The treatment room requires a 9 foot ceiling height due to the specialty surgery lighting required. Seamless vinyl flooring and epoxy paint should be used as they are easy to keep clean.

Medical gasses for the laboratories, operatories, and treatment room should be stored in a separate one-hour fire resistant room with an automatic sprinkler system. Additional pressure gauges should be installed in the operatories and treatment room.

Operatories also require a 9 foot ceiling because of specialty lighting needed for dental exams.

An inter-office communication system of some type is required for the smooth operation of examination schedules and other appointments.

COST ESTIMATE

The following estimate is based on information from the "1985 Architects, Contractors, and Engineers Guide to Construction Costs", and the "Means 1985 Building Cost Construction Data".

A.	General Conditions (5,516 x 2.45)	$ 13,514
B.	Site Work (5,516 x 1.00)	5,516
C.	Building Costs (5,516 x 50.05)	276,075
D.	Special Construction (5,516 x .35)	1,930
E.	Equipment (5,516 x 4.15)	22,891
F.	TOTAL CONSTRUCTION	$319,926
G.	Contractors Services and Temporary Financing (5,516 x 5.80)	31,992
H.	Professional Fee (85.% of F.)	27,193
I.	Contingencies (5% of F.)	15,996
J.	Administrative Costs (0.5% of F.)	1,599
K.	Building Permit and Plan Check (60 + .02/SF)	170
L.	TOTAL FEES	$ 76,950
M.	Land Acquisition (4 Lots @ 5,000 each)	20,000
N.	GRAND TOTAL	$416,876

NOTES

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2. IBID, p. 2.

3. IBID, p. 45.

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2. 1980 Census Definition of Rural-Everything that is not Urban. Urban-all persons living in urbanized areas and in places of 2500 or more inhabitants outside urbanized areas.

3. Randall Thoreson, Three Forks Master Plan, Three Forks Planning Board, Three Forks, Montana, 1981, p. 54.

4. Interview with Guy Uithof, Three Forks Chamber of Commerce, Nov. 22, 1985.

5. _____, and Mark Ivey, A Cement Maker that may be Selling its Future, Business Week, Nov. 18, 1985, p. 87.

6. Interview with Rod Frick, Three Forks Chamber of Commerce, Nov. 22, 1985.

7. Interview with Sharon Smith, Clerk for the City of Three Forks, Nov. 7, 1985, and with Randall Thoreson, City Planning Consultant, Nov. 18, 1985.

8. Interview with Randall Thoreson, City Planning Consultant, Nov. 18, 1985.

9. Randall Thoreson, Three Forks Master Plan, Three Forks Planning Board, Three Forks, Montana, 1981, p. 6.

10. Interview with Dr. Edward Bertagnolli, Family Practice Physician, Three Forks, Montana, Nov. 18, 1985.

11. Interview with Dr. Lindon Durham, Dentist, Three Forks, Montana, Nov. 18, 1985.

12. Interview with Jim Williams, Assistant Administrator, Bozeman Deaconess Hospital, Bozeman, Montana, Nov. 26, 1985.

13. Interview with Rod Frick, Three Forks Chamber of Commerce, Nov. 22, 1985.

14. Frances Dening, Growing Pains Three Forks Montana 1908-1976, School District J-24, Three Forks, Montana, 1975, p. 6.

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23. IBID, p. 19.

24. U.S. Department of Commerce, Bureau of the Census, 1980 Census, U.S. Government Printing Office, Washington, D.C., 1983.

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2. American Hospital Association, AHA Guide, American Hospital Association Guide to the Health Care Field, 1985 Edition, American Hospital Association, 1985, p. A152.

3. Interview with Dr. Edward Bertagnolli, Family Practice Physician, Three Forks, Montana, Nov. 18, 1985.

4. Owen B. Hardy and Lawrence P. Lammers, Hospitals, The Planning and Design Process, Aspen Systems Corporation, Germantown, Maryland, 1977, p. 51.

5. U.S. Department of Commerce, Bureau of the Census, 1980 Census, U.S. Government Printing Office, Washington, D.C., 1983.

6. Owen B. Hardy and Lawrence P. Lammers, Hospitals, the Planning and Design Process, Aspen Systems Corp., Germantown, Maryland, 1977, p. 51.

7. Interview with Dr. Edward Bertagnolli, Family Practice Physician, Three Forks, Montana, Nov. 18, 1985, and Interview with Dr. Lindon Durham, Dentist, Three Forks, Montana, Nov. 18, 1985.

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5. Interview with Dr. Edward Bertagnolli, Family Practice Physician, Three Forks, Montana, Nov. 18, 1985.

INTERVIEWS

Dr. Edward Bertagnolli
Family Practice Physician
Three Forks, Montana

Dr. Joseph Caprio
Professor of Atmospheric Science
Montana State University
Bozeman, Montana

Dr. Lindon Durham
Dentist
Three Forks, Montana

Mr. Andrew Rykels
Three Forks City Engineering Consultant
Thomas, Dean, and Hoskins, Inc.
Bozeman, Montana

Mrs. Sharon Smith
Three Forks City Clerk
Three Forks, Montana

Mr. Randall Thoreson
Three Forks City Planning Consultant
Bozeman, Montana

Mr. Guy Uithof and Mr. Rod Frick
Three Forks Chamber of Commerce
Three Forks, Montana

Mr. Jim Williams
Assistant Administrator
Bozeman Deaconess Hospital
Bozeman, Montana

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APPENDICES

Appendix A

Original Thesis Description

Appendix B

1980 Census Information

Appendix C

Space Program Details

Appendix A

MONTANA STATE UNIVERSITY
SCHOOL OF ARCHITECTURE

THESIS: ARCH 555 & 556

STUDENT'S NAME: BRUCE BOLLENBACH

QUARTERS: FALL '85 / WINTER '86

DATE: MAY 20, 1985

THESIS DESCRIPTION: I INTEND TO STUDY THE HEALTH CARE NEEDS OF SMALL TOWNS IN MONTANA WHICH ARE OUTSIDE THE LIMITS OF THE AREA SERVED BY THE MEDICAL CARE FACILITIES OF LARGER COMMUNITIES. I PROPOSE TO DEVELOP AN EMERGENCY CENTER/ MEDICAL CLINIC FOR TOWNS SUCH AS THREE FORKS OR BIG TIMBER WHICH ARE LOCATED MIDWAY BETWEEN TWO LARGER COMMUNITIES ALONG A MAJOR HIGHWAY ROUTE.

ADVISOR: CHRIS BERGUM

ADVISOR'S SIGNATURE: Christian Bergum (Date)

Appendix B

3F -- THREE FORKS

ED -- ENUMERATION DISTRICTS

MT -- MONTANA

M -- MALE

F -- FEMALE

Population by Sex

	M	F	Total
3F	633	614	1,247
ED	4,643	4,433	9,076
MT	392,625	394,065	786,690

Population by Age

		3F		ED	MT
0--5	(91)	7.3%	(890)	9.8%	9.8%
6-14	(169)	13.6%	(1431)	15.8%	14.0%
15-21	(140)	11.2%	(1050)	11.6%	13.3%
22-44	(352)	28.2%	(2833)	31.2%	33.8%
45-64	(289)	23.2%	(1801)	19.8%	18.4%
65-+	(206)	16.5%	(1067)	11.8%	10.8%
Median Age		34.7%		31.3%	29.0%
Mail		32.6%		31.0%	28.4%
Female		37.3%		31.7%	29.6%

Marital Status

	3F	ED	MT
Single	19.0%	20.1%	24.1%
Married	65.0%	68.5%	61.9%
Separated	1.3%	.7%	.9%
Widowed	8.8%	6.4%	6.8%
Divorced	6.1%	4.3%	6.4%

Female Population by Age

		3F		ED	MT
0-5	(39)	6.4%	(427)	9.6%	9.4%
6-14	(80)	13.0%	(712)	16.1%	13.8%
15-21	(66)	10.8%	(469)	10.6%	12.9%
22-44	(169)	27.5%	(1370)	30.9%	33.3%
45-64	(150)	24.4%	(903)	20.4%	18.6%
65-+	(110)	17.9%	(548)	12.4%	12.1%

Population by Race

	3F	ED	MT
White	97.4%	98.2%	93.0%
Black	--	--	.2%
American Indian	1.2%	.7%	4.7%
Asian & Pacific Isc.	.3%	.3%	.4%
Spanish Origin	.5%	.5%	1.3%
Other	.6%	.3%	.41%

Population by Ancestry

	3F	ED	MT
Dutch	5.3%	14.1%	1.0%
English	11.6%	10.0%	7.4%
French	1.5%	1.0%	1.5%
German	14.6%	12.4%	13.8%
Irish	5.1%	6.6%	5.2%
Greek	.7%	.1%	.1%
Italian	.6%	.8%	.9%
Norwegian	5.4%	2.8%	4.6%
Polish	.5%	.4%	.6%
Portugese	.6%	.1%	.04%
Scottish	2.0%	1.3%	1.0%
Swedish	2.6%	1.6%	1.6%
Other	6.7%	5.9%	9.6%
Mult-Ancestry	41.2%	31.5%	39.7%
Not Specified	1.6%	11.4%	12.96%

Persons in Selected Multiple Ancestry

	3F	ED	MT
English & Other Groups	32.8%	29.0%	24.8%
French	6.4%	9.4%	9.8%
German	30.9%	28.3%	34.0%
Irish	25.6%	27.0%	27.2%
Italian	3.0%	4.4%	2.3%
Polish	1.4%	2.0%	1.9%

Veteran Status

	3F	ED	MT
Vet	14.0%	14.8%	13.8%

Persons Below the Poverty Level

	3F	ED	MT
	13.6%	10.1%	12.3%
	170 People	910 People	94,280 People

Number of Households by Income (1979)

	3F	ED	MT
0 to 14,999	56.3%	50.8%	48.7%
15,000 to 29,999	35.2%	36.7%	36.8%
30,000 to 49,999	5.1%	9.3%	11.6%
50,000 to +	3.4%	2.9%	3.0%
Median	12,714	14,228 (Average Mean)	15,420
Mean	15,539	16,753 (Average Mean)	17,994

Number of Families by Income (1979)

	3F	ED	MT
0 to 14,999	46.1%	42.0%	38.2%
15,000 to 29,999	41.9%	42.4%	43.5%
30,000 to 49,999	7.2%	12.0%	14.6%
50,000 to +	4.7%	3.7%	3.7%
Median	15,993	16,537 (Average Mean)	18,413
Mean	18,070	19,150 (Average Mean)	20,659

Educational Level

Persons 25 years and older by years of school completed.

		3F	ED	MT
High School	1-3 yrs	28.5%	28.3%	24.6%
	4 yrs	45.9%	41.6%	39.9%
College	1-3 yrs	16.0%	16.4%	20.2%
	4+ yrs	9.6%	13.8%	15.2%

Mean Number of Children Per Family Type

	3F	ED	MT
Married Couple	.9%	.9%	1.1%
Male Household (no wife)	.6%	.7%	.7%
Female Household (no husband)	1.1%	1.0%	1.2%

Households by Number in Household

	3F	ED	MT
1	27.4%	20.6%	23.2%
2	34.7%	33.7%	31.9%
3	15.2%	15.3%	16.6%
4	11.0%	15.9%	15.7%
5	7.1%	9.0%	7.9%
6+	4.7%	5.5%	4.8%
	499	3191	283,742

Population by Place of Birth

	3F	ED	MT
Born in State	57.0%	65.0%	57.0%
Born in Different State	41.0%	32.8%	40.2%
Born Abroad	.4%	.2%	.5%
Foreign Born	1.7%	2.0%	2.3%

Population by Residence in 1975

	3F	ED	MT
Same House	52.6%	53.8%	48.7%
Different House in USA			
-Same Country	25.8%	23.4%	25.2%
-Different Country			
-Same State	7.5%	12.5%	12.6%
-Different State			
-NE	1.0%	.4%	1.0%
-NCENT	3.4%	1.9%	4.2%
-S	--	.4%	1.8%
-W	9.3%	7.2%	5.6%
Abroad	.5%	.4%	1.0%

Rental Housing Units and Median Rent (1979)

	Rental Units/Total Housing	Median Monthly Rent
3F	25%	123.00
ED	21%	122.00
MT	31%	165.00

Housing Units by Value

	3F	ED	MT
0 to 19,999	19.0%	16.5%	11.9%
20,000 to 39,999	48.1%	35.8%	26.6%
40,000 to 79,999	32.1%	43.3%	52.2%
80,000 to +	.8%	4.4%	9.3%
Median	33,700	36,860 (Average Median)	46,400

Housing Units by Age

	3F	ED	MT
1975-March 1980	13.7%	17.7%	17.8%
1960-1974	22.6%	27.1%	27.7%
1940-1959	13.2%	14.0%	24.1%
1939 & Earlier	50.5%	41.3%	30.4%

Vacant Housing Units

	3F	ED	MT
	9.8%	13.4%	10.0%
Number of Vacant	54	493	31,356

Multi-Family Housing Units

	3F	ED	MT
1	69.1%	73.0%	70.4%
2-9	11.2%	10.3%	12.8%
10 +	0.7%	0.8%	5.0%
Mobil Home and Trailer	19.0%	16.0%	11.8%

Home Heating Fuel

	3F	ED	MT
Utility Gas	90.6%	44.8%	60.9%
Bottley Gas or LP	--	9.7%	7.4%
Electricity	7.4%	14.9%	14.6%
Fuel Oil, Keroscene, Etc.	.8%	18.5%	6.8%
Coal or Coke	--	.2%	1.0%
Wood	1.2%	11.9%	9.1%
Other Fuel	--	--	.2%
No Fuel Used	--	--	.03%

Home Cooking Fuel

	3F	ED	MT
Utility Gass	17.2%	7.4%	17.2%
Bottled Gas or LP	.8%	4.8%	5.2%
Electricity	82.0%	87.0%	76.4%
Other	--	.6%	.9%
No Fuel Used	--	.3%	.3%

Home Hot Water Heating Fuel

	3F	ED	MT
Utility Gas	72.1%	37.7%	56.0%
Bottled Gas or LP	.4%	8.5%	5.9%
Electricity	27.5%	51.7%	36.5%
Fuel Oil, Kerosene, Etc.	--	1.5%	.4%
Other	--	--	.4%
No Fuel Used	--	0.5%	.8%

Vehicles Per Housing Unit

	3F	ED	MT
1	36.1%	25.0%	30.9%
2	38.8%	45.0%	41.0%
3 + or More Vehicles	25.1%	30.0%	28.2%

Transportation to Work

	3F	ED	MT
Car Truck Van	62.8%	66.7%	76.9%
Public Trans	--	--	1.1%
Walked	26.3%	21.3%	13.0%
Other Means	8.6%	3.7%	3.3%
Worked @ Home	2.3%	8.3%	5.7%

Travel Time to Work

	3F	ED	MT
0-9 minutes	56.2%	44.4%	35.4%
10-19 minutes	26.7%	22.5%	40.7%
20-44 minutes	15.8%	23.5%	19.0%
45 + minutes	1.3%	9.6%	4.9%
Mean minutes	11.5	18.0 (Average Mean)	14.5

Households by Income Type

		3F	ED	MT
Earnings Total	(375)	69.7%	77.3%	78.0%
Wage or Salary	(348)	10.2%	35.8%	12.8%
Non-Farm Self Employment	(51)	1.4%	17.4%	8.3%
Farm Self Employment	(7)	30.7%	37.0%	40.1%
Interest, Dividend, or Net Rental	(154)	30.7%	28.5%	25.1%
Social Security	(159)	31.9%	3.1%	5.0%
Public Assistance	(18)	3.6%	19.4%	24.2%
All Other	(110)	22.0%	--	--

Occupations

		3F	ED	MT
Executive, Administrative, and Managerial	(26)	6.3%	6.6%	10.3%
Professional Specialty	(39)	9.4%	9.7%	12.3%
Technicians and Related Support Occupations	(7)	1.7%	1.5%	2.4%
Sales	(32)	7.8%	7.9%	10.3%
Administrative Support Including Clerical	(72)	17.3%	12.7%	14.8%
Service Occupations	(68)	16.4%	10.7%	15.1%
Farming, Forestry, and Fishing	(34)	24.1%	24.1%	9.3%
Precision Production, Craft, and Repair	(38)	9.1%	13.0%	12.2%
Machine Operations, Assemblers, and Inspectors	(24)	5.8%	2.5%	3.4%
Transportation and Material Moving	(33)	7.9%	7.5%	5.3%
Handelers, Equipment Cleaners, Helpers, and Laborers	(43)	10.3%	3.9%	4.6%

Industry

		3F	ED	MT
Agriculture, Forestry, Fisheries, and Mining	(46)	11.1%	28.4%	13.2%
Construction	(10)	2.4%	7.6%	7.0%
Manufacturing	(90)	21.6%	8.8%	7.4%
Transportation	(23)	5.5%	4.5%	5.7%
Communication and Other Public Utilities		--	2.5%	3.3%
Wholesale and Retail Trade	(116)	27.9%	18.1%	22.5%
Finance, Insurance, and Real Estate	(21)	5.1%	4.4%	4.9%
Business and Repair Services	(10)	2.4%	2.0%	3.1%
Personal Entertainment and Recreational Services	(21)	5.1%	3.6%	4.6%
Professional and Related Services (Health, Education, and Other)	(67)	16.1%	16.0%	21.6%
Public Administration	(12)	2.9%	4.1%	6.7%

Class of Worker

	3F	ED	MT
Private Wage and Salary	75.0%	56.0%	65.2%
Federal Government	--	3.8%	5.6%
State Government	4.6%	8.9%	6.5%
Local Government	9.4%	7.2%	9.7%
Self-Employed	10.3%	23.2%	12.1%
Unpaid Family Worker	.7%	.8%	.9%

Appendix C

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- WAITING

AREA REQUIRED:
- 19 SEATS @ 20# EA. = 380 FT²

ACTIVITY:
- PATIENT WAITING
- READING
- CONVERSING

USERS:
- PATIENTS
- RELATIVES

ADJACENCIES:
- RECEPTION

ILLUMINATION:
- GENERAL (INDIRECT)
- DAYLIGHT
- READING

ACOUSTICS:
- CONVERSATION NOISE

FURNISHINGS AND EQUIPMENT:
- CHAIRS
- END TABLES
- TABLE LAMPS
- PLANTS
- COAT RACK
- ARTWORK
- CHILDRENS AREA

CONSIDERATIONS:
- PATIENTS INTRODUCTION TO THE OFFICE
- CONSERVATIVE IMAGE, NOT COMPULSIVE
- ESTABLISH RAPPORT AND PUT PATIENT AT EASE
- REFLECT DOCTORS ATTITUDES
- PRIVACY ZONE IN SEATING CLOSENESS

- AN ENVIRONMENT TO PROMOTE HEALTH RATHER THAN AGGRAVATE ILLNESS AND FEED ANXIETY.

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- RECEPTION

AREA REQUIRED:
- 150 FT² MIN.

ACTIVITY:
- APPOINTMENT ORGANIZING

USERS:
- RECEPTIONIST
- OFFICE MANAGER
- NURSE & HYGIENIST

ADJACENCIES:
- WAITING
- BUSINESS OFFICE

ILLUMINATION:
- GENERAL
- DESK USE

ACOUSTICS:
- TELEPHONE
- TYPEWRITER

FURNISHINGS AND EQUIPMENT:
- COUNTER SPACE
- MEDICAL RECORDS FILE
- BULLITIN BOARD
- CHAIR

CONSIDERATIONS:
- A RECEPTION COUNTER TO WELCOME NOT CLOSE OUT
- VISION OF WAITING ROOM
- REMAIN SEATED YET WORK IN SEVERAL DIRECTIONS

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- BUSINESS OFFICE

AREA REQUIRED:
- 120 FT² MIN.

ACTIVITY:
- PATIENT BILLING
- INSURANCE PROCESSING
- BOOKKEEPING

USERS:
- OFFICE MANAGER
- RECEPTIONIST
- PATIENT

ADJACENCIES:
- RECEPTION

ILLUMINATION:
- GENERAL
- DESK USE

ACOUSTICS:
- COMPUTER NOISE

FURNISHINGS AND EQUIPMENT:
- COMPUTER
- INACTIVE FILES
- OFFICE DESK & CHAIR
- GUEST CHAIRS
- COPY MACHINE

CONSIDERATIONS:
- COMMUNICATING WITH PATIENTS
- MINIMAL DISTRACTIONS WHEN BILLING & BOOKKEEPING

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- CONFERENCE ROOM

AREA REQUIRED:
- 120 FT^2 MIN.

ACTIVITY:
- STAFF MEETINGS
- LUNCH BREAK

USERS:
- STAFF

ADJACENCIES:
- SHARED BY ALL DEPARTMENTS

ILLUMINATION:
- GENERAL
- READING
- COUNTER USE

ACOUSTICS:
- CONVERSATION NOISE

FURNISHINGS AND EQUIPMENT:
- TABLE AND CHAIRS
- COUNTER AND SINK
- CABINETS
- MICROWAVE
- REFRIGERATOR
- LOUNGE CHAIRS
- END TABLE
- TABLE LAMP

CONSIDERATIONS:
- RELAXED ENVIRONMENT
- COAT CLOSET

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- HOUSEKEEPING CLOSET

AREA REQUIRED:
- 20 FT² MIN.

ACTIVITY:
- STORAGE OF CLEANING SUPPLIES

USERS:
- MAINTENENCE
- STAFF

ADJACENCIES:
- CENTRAL LOCATION

ILLUMINATION:
- GENERAL

ACOUSTICS: ———

FURNISHINGS AND EQUIPMENT:
- SHELVING
- LARGE SINK
- MOP RACK

CONSIDERATIONS: ———

SPACE PROGRAM

DEPARTMENT:
- SHARED SPACE

ROOM NAME:
- MECHANICAL EQUIPMENT ROOM

AREA REQUIRED:
- 100 FT² MIN

ACTIVITY:
- BUILDING HEATING AND COOLING
- HOT WATER HEATING
- HUMIDITY CONTROL

USERS:
- MAINTENENCE

ADJACENCIES:
- EXTERIOR WALL
- CENTRAL LOCATION

ILLUMINATION:
- GENERAL

ACOUSTICS:
- MACHINE NOISE

FURNISHINGS AND EQUIPMENT:
- GAS FORCED AIR FURNACE
- GAS HOT WATER HEATER
- HUMIDIFIER
- TELEPHONE BOARD
- AIR CONDITIONER
- AIR COMPRESSOR
- VACUM PUMP
- STORAGE SHELVING

CONSIDERATIONS:
- EQUIPMENT REPLACMENT
- BUILDING EXPANSION

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- EXAM

AREA REQUIRED:
- 96 FT² MIN. (8×12)

ACTIVITY:
- PATIENT EXAMINATION AND TREATMENT

USERS:
- PATIENT
- NURSE
- PHYSICIAN

ADJACENCIES:
- NURSE STATION

ILLUMINATION:
- GENERAL
- SINK USE

ACOUSTICS:

FURNISHINGS AND EQUIPMENT:
- EXAMINATION TABLE
- SINK
- COUNTER AND WRITING SPACE
- CABINETS
- DRESSING CURTAIN
- GUEST CHAIR
- STOOL ON CASTERS
- CLOTHES HOOKS AND MIRROR
- PORTABLE MEDICAL EQUIPMENT

CONSIDERATIONS:
- PATIENT PSYCHOLOGICAL COMFORT
- PHYSICIAN EFFICIENCY

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- NURSE STATION

AREA REQUIRED:
- 120 FT² MIN

ACTIVITY:
- WEIGH AND MEASURE PATIENTS
- STERILIZE INSTRUMENTS
- DISPENSE DRUGS

USERS:
- NURSE
- PATIENT

ADJACENCIES:
- EXAM

ILLUMINATION:
- GENERAL
- COUNTER USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- COUNTER
- CABINETS
- SINK
- REFRIGERATOR
- AUTOCLAVE

CONSIDERATIONS:
- SPACE FOR PATIENT DURING PRE AND POST EXAM
- EFFICIENCY OF OPERATION
- WORK ROOM AND PREP SPACE

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- X-RAY

AREA REQUIRED:
- 200 FT² MIN. (30 FT² DARKROOM)

ACTIVITY:
- X-RAY PHOTOGRAPHY AND PROCESSING

USERS:
- PATIENT
- NURSE

ADJACENCIES:
- EXAM
- TREATMENT ROOM
- NURSE STATION

ILLUMINATION:
- GENERAL
- DARKROOM FIXTURES

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- DRESSING CURTAIN
- CHAIR AND CLOTHES HOOKS
- X-RAY EQUIPMENT AND TABLE
- DARKROOM: SINK
  COUNTER
  CABINETS

CONSIDERATIONS:
- INTERIOR WALLS AND DOOR MUST BE LEAD SHIELDED
- 9'-0" CEILING HEIGHT
- CONTROL SPACE

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- TREATMENT ROOM

AREA REQUIRED:
- 144 FT² MIN.

ACTIVITY:
- CAST ROOM
- EMERGENCY OPERATING ROOM
- EKG ROOM

USERS:
- PATIENT
- NURSE
- PHYSICIAN

ADJACENCIES:
- NURSE STATION

ILLUMINATION:
- GENERAL
- COUNTER USE
- SURGICAL LIGHT

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- COUNTER
- CABINETS
- SINK
- OPERATING TABLE
- SURGICAL LIGHT
- X-RAY VIEWER

CONSIDERATIONS:
- 9'-0" MIN. CEILING
- ALTERNATE ENTRY (AVOID WAITING ROOM)
- OXYGEN, AIR, VACUM, ETC.

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- LABORATORY

AREA REQUIRED:
- 100 FT² MIN.

ACTIVITY:
- SPECIMEN ANALYSIS

USERS:
- NURSE
- PHYSICIAN

ADJACENCIES:
- NURSE STATION
- EXAM

ILLUMINATION:
- GENERAL
- COUNTER USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- COUNTER
- CABINETS
- DOUBLE SINK

CONSIDERATIONS:
- GAS, AIR, OXYGEN, VACUM, ETC.
- SEMI-SECLUDED WORKSPACE

SPACE PROGRAM

DEPARTMENT:
- MEDICAL

ROOM NAME:
- OFFICE

AREA REQUIRED:
- 100 FT² MIN.

ACTIVITY:
- PATIENT CONSULTATION
- PRIVATE STUDY

USERS:
- PHYSICIAN
- PATIENT

ADJACENCIES:
- SEMI-PRIVATE LOCATION

ILLUMINATION:
- GENERAL
- DESK USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- OFFICE DESK AND CHAIR
- BOOKSHELVES
- COUCH
- END TABLE
- TABLE LAMP

CONSIDERATIONS:
- MINIMAL CORRIDOR TRAFFIC OUTSIDE DOOR
- PROFESSIONAL YET COMFORTABLE ATMOSPHERE

SPACE PROGRAM

DEPARTMENT: —MEDICAL

ROOM NAME: —STORAGE

AREA REQUIRED: —75 FT² MIN.

ACTIVITY: —MEDICAL SUPPLY STORAGE

USERS: —NURSE

ADJACENCIES: —NURSE STATION

ILLUMINATION: — GENERAL

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT: —SHELVING

CONSIDERATIONS: _____

SPACE PROGRAM

DEPARTMENT:
- DENTAL

ROOM NAME:
- OPERATORY

AREA REQUIRED:
- 92 FT² MIN

ACTIVITY:
- EXAMINATION
- TREATMENT

USERS:
- PATIENT
- DENTIST
- HYGIENIST

ADJACENCIES:
- STERILIZATION

ILLUMINATION:
- GENERAL
- OPERATING LIGHT

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- SINK
- CABINET
- COUNTER
- DENTAL CHAIR
- X-RAY VIEWER

CONSIDERATIONS:
- PSYCHOLOGICAL NEEDS OF THE PATIENT
- EFFICIENCY OF THE DENTIST
- 9'-0" CEILING
- MEDICAL GAS SYSTEM

SPACE PROGRAM

DEPARTMENT:
- DENTAL

ROOM NAME:
- HYGIENIST

AREA REQUIRED:
- 100 FT^2 MIN.

ACTIVITY:
- X-RAY PHOTOGRAPHY
- DENTAL PROPHYLAXIS PROCEEDURES

USERS:
- HYGIENIST
- PATIENT

ADJACENCIES:
- OPERATORIES

ILLUMINATION:
- GENERAL
- OPERATING LIGHT

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- DENTAL CHAIR
- COUNTER
- CABINETS
- SINK
- X-RAY EQUIPMENT

CONSIDERATIONS:
- LEAD LINED WALLS
- PSYCHOLOGICAL NEEDS OF THE PATIENT
- EFFICIENCY OF THE HYGIENIST
- 9'-0" CEILING HEIGHT

SPACE PROGRAM

DEPARTMENT: – DENTAL

ROOM NAME: – ALCOVE

AREA REQUIRED: – 40 FT^2 MIN.

ACTIVITY:
– INSTRUMENT STERILIZATION
– X-RAY FILM PROCESSING

USERS: – HYGIENIST

ADJACENCIES: – OPERATORIES

ILLUMINATION: – GENERAL

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
– COUNTER
– CABINET
– SINK
– AUTOCLAVE
– FILM PROCESSOR

CONSIDERATIONS:
– OUT OF TRAFFIC FLOW

SPACE PROGRAM

DEPARTMENT:
- DENTAL

ROOM NAME:
- LABORATORY

AREA REQUIRED:
- 100 FT² MIN.

ACTIVITY:
- TESTING
- FABRICATING

USERS:
- DENTIST
- HYGIENIST

ADJACENCIES:
- SEMI-SECLUDED

ILLUMINATION:
- GENERAL
- COUNTER USE

ACOUSTICS:
- MACHINE NOISE

FURNISHINGS AND EQUIPMENT:
- DENTAL ENGINE, LATHE, AND OTHER TOOLS
- COUNTER
- CABINETS
- CENTRAL SINK
- PLASTER BIN
- GAS BURNER
- AIR AND VACUM

CONSIDERATIONS:
- WORKSTATION ORGANIZATION

SPACE PROGRAM

DEPARTMENT:
- DENTAL

ROOM NAME:
- OFFICE

AREA REQUIRED:
- 100 FT² MIN.

ACTIVITY:
- CONSULTATION
- PRIVATE STUDY

USERS:
- DENTIST
- PATIENT

ADJACENCIES:
- SEMI-SECLUDED

ILLUMINATION:
- GENERAL
- DESK USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- DESK AND CHAIR
- BOOKSHELVES
- COUCH
- END TABLE

CONSIDERATIONS:
- MINIMAL AMOUNT OF TRAFFIC IN CORRIDOR OUTSIDE
- PROFESSIONAL AND COMFORTABLE ATMOSPHERE

SPACE PROGRAM

DEPARTMENT:
— DENTAL

ROOM NAME:
— STORAGE

AREA REQUIRED:
— 30 FT² MIN.

ACTIVITY:
— DENTAL SUPPLY STORAGE

USERS:
— HYGIENIST

ADJACENCIES: _____

ILLUMINATION:
— GENERAL

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
— SHELVING

CONSIDERATIONS: _____

SPACE PROGRAM

DEPARTMENT:
- PHARMACY

ROOM NAME:
- DISPENSING

AREA REQUIRED:
- 150 FT² MIN.

ACTIVITY:
- PREPARATION
- DISTRIBUTION

USERS:
- PHARMACIST

ADJACENCIES:
- WAITING
- DISPLAY AREA

ILLUMINATION:
- GENERAL
- COUNTER USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- CABINETS
- COUNTER SPACE
- SINK
- REFRIGERATOR

CONSIDERATIONS:
- EFFICIENT OPERATION
- 8" RAISED FLOOR

SPACE PROGRAM

DEPARTMENT:
- PHARMACY

ROOM NAME:
- DISPLAY AREA

AREA REQUIRED:
- 120 FT² MIN.

ACTIVITY:
- SHOPPING

USERS:
- PATIENTS
- STAFF

ADJACENCIES:
- WAITING
- CORRIDOR (ENTRY/ EXIT)

ILLUMINATION:
- GENERAL

ACOUSTICS:
- CASH REGISTER NOISE

FURNISHINGS AND EQUIPMENT:
- DISPLAY SHELVING

CONSIDERATIONS:
- ATTENTION GETTING

SPACE PROGRAM

DEPARTMENT:
- PHARMACY

ROOM NAME:
- OFFICE

AREA REQUIRED:
- 100 FT² MIN.

ACTIVITY:
- RECORD KEEPING

USERS:
- PHARMACIST

ADJACENCIES:
- DISPENSING

ILLUMINATION:
- GENERAL
- DESK USE

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
- OFFICE DESK & CHAIR
- FILES
- SHELVING

CONSIDERATIONS:
- VIEW OF DISPENSING

SPACE PROGRAM

DEPARTMENT: – PHARMACY

ROOM NAME: – STORAGE

AREA REQUIRED: – 30 FT² MIN.

ACTIVITY: – STORAGE OF DRUGS AND SUPPLIES

USERS: – PHARMACIST

ADJACENCIES: – DISPENSING

ILLUMINATION: – GENERAL

ACOUSTICS: _____

FURNISHINGS AND EQUIPMENT:
– SHELVING

CONSIDERATIONS: _____

SPACE PROGRAM

DEPARTMENT:
- ALL DEPARTMENTS

ROOM NAME:
- TOILET

AREA REQUIRED:
- 30 FT² MIN.

ACTIVITY:
- GENERAL USE
- WASHING
- SPECIMEN COLLECTION

USERS:
- PATIENTS
- STAFF

ADJACENCIES:
- CONVIENCE OF DEPARTMENT

ILLUMINATION:
- GENERAL
- SINK USE

ACOUSTICS:
- ISOLATE ACOUSTICALLY

FURNISHINGS AND EQUIPMENT:
- TOILET
- SINK
- MIRROR
- GRAB BARS

CONSIDERATIONS:
- HANDICAP DESIGN

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